

tion more or less subimpressed above and slightly prominulous beneath; inflorescence axillary, crowded near the apex of the twigs, equaling or slightly surpassing the subtending leaves, solitary in each axil; peduncles filiform, 1.5--2.3 cm. long, densely spreading-villous; heads subglobose, yellowish, about 1.5 cm. long and wide, densely many-flowered; bracts papery, subobtusate at the apex, densely pubescent on both surfaces.

The type of this species was collected by Howard Scott Gentry (no. 18267) in an *Opuntia* thicket on a rocky slope in cactus-acacia association, altitude 6200 feet, Villa Nueva, Zacatecas, Mexico, on November 29, 1959, and is deposited in the C. L. Lundell Herbarium at the Texas Research Foundation, Renner, Texas.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS *VERBENA*. IX

Harold N. Moldenke

VERBENA CATHARINAE Moldenke

Inflorescence rather few-flowered; peduncles very slender, about 2 cm. long, sparsely hirsute; bractlets lanceolate, 2--3 mm. long, attenuate-acute at the apex, hirsutulous especially on the margins; calyx cylindric, about 8 mm. long and 1--1.5 mm. wide, hirsutulous-pubescent, some of the hairs capitate-glandulose; corolla blue, hypocrateriform, its tube about 11 mm. long, puberulous on the outside above the calyx, its lobes also pilosulous-puberulous beneath.

The type of this species was collected by my good friend, Padre Raulino Reitz (no. C.1561) on a campo at Taimbesinho, altitude 900 meters, Araranguá, Santa Catarina, Brazil, on February 15, 1946, and is deposited in the Barbosa Rodrigues Herbarium at Itajai, Brazil. The species is said to be a ruderal one and has been found on campos and rock outcrops, growing at from 760 to 1200 meters altitude, in flower in February, October, and December. Vernacular names recorded for it are "camaradinha", "formosa sem dote", and "jurupeba", names which are apparently given to many other species of the genus in Brazil.

In all, 10 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 3363 (Z). Santa Catarina: Reitz C.1561 (N--isotype, Rd--2121--type); Smith & Klein 8055 (Ok, W--2251336), 11403 (Ok, W--2251777); Smith & Reitz 8917 (Ok, W--2251467); Smith, Reitz, & Sufridini 9561 (W--2249363).

VERBENA CHACENSIS Moldenke, *Phytologia* 5: 228--229. 1955.

Bibliography: Moldenke, *Phytologia* 5: 228--229. 1955; G. Taylor, *Ind. Kew. Suppl.* 12: 149. 1959; Moldenke, *Résumé* 494 & 495. 1959; Moldenke, *Résumé Suppl.* 1: 7 & 25. 1959.

Herb, 40--50 cm. tall; stems simple or branching into two at the base, tetragonal, deeply sulcate between the angles, densely short-pubescent with erect mostly glanduliferous hairs, less densely so toward the base; principal internodes 3--5.5 cm. long; leaves decussate-opposite, sessile, elliptic or narrow-elliptic, 6--7 cm. long when mature and 1.5--2.5 cm. wide, the upper ones much narrower and oblong, often recurved, acute at the apex, cuneate-acuminate to the amplexicaul base, sharply and irregularly serrate from above the cuneation to the apex, scabrous and obscurely short-pubescent above, more densely short-pubescent with glanduliferous hairs beneath; midrib slender, impressed above, very prominent beneath; secondaries slender, about 4 per side, ascending, not arcuate, ending in the teeth, impressed above, very prominent beneath; veinlet reticulation very abundant and conspicuous, impressed above and very prominent beneath; inflorescence terminal, spicate, usually with one shorter side-branch, densely many-flowered; peduncles similar to the stems in texture and pubescence, about 9.5 cm. long, with a gall-like globular protuberance above the mid-point; floriferous portion of the spikes 3--8 cm. long, the upper flowers densely overlapping, the lower fruits more distant; rachis densely short-pubescent with brownish glanduliferous hairs like the stems; bractlets lanceolate, about 4 mm. long, equaling or slightly surpassing the calyx, pilose on the back, ciliate-margined; calyx tubular, about 3 mm. long, strigillose, its rim minutely 5-toothed; corolla about 4.5 mm. long, its limb 2 mm. wide.

The type of this species was collected by Teodoro Rojas [Hassler 2459] at Lomal Clavel, latitude S.23°20', in the Gran Chaco, Paraguay, in November, 1903, and is deposited in the herbarium of the University of California at Berkeley. The species is known from only the type collection. Only 2 specimens, including the type, have been examined by me.

Citations: PARAGUAY: T. Rojas s.n. [Hassler 2459] (Ca--929435-type, Z--isotype).

VERBENA CHEITMANIANA Moldenke, Phytologia 2: 420--421. 1948.

Bibliography: Moldenke, Phytologia 2: 420--421. 1948; Moldenke, Castanea 13: 118--119. 1948; Moldenke, Alph. List Cit. 4: 1293. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 197. 1949; Moldenke, Phytologia 3: 135. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Phytologia 5: 24. 1954; Moldenke, Résumé 127 & 471. 1959; Moldenke, Résumé Suppl. 3: 14. 1962.

Sprawling herb; stems often procumbent, very slender, elongate, acutely tetragonal, strigillose or glabrescent; branches rather few, very slender, elongate, sprawling, acutely tetragonal, often slightly sulcate between the angles, rather densely strigillose with very short and whitish reflexed hairs; nodes annulate; principal internodes 1.5--7.5 cm. long; leaves decussate-opposite, apparently often numerous only toward the tips of the branches; petioles slender, 1--1.5 cm. long, margined, densely

pilose-pubescent with subappressed, whitish, antrorse hairs; leaf-blades membranous, somewhat lighter green beneath, not brunescent in drying, triangular-ovate in outline, 1.5--4 cm. long, 1--3 cm. wide, attenuate-acute at the apex (or merely acute on smaller leaves), cuneately acuminate into the petiole at the base, irregularly incised, often more or less distinctly 3-lobed, appressed-strigillose on both surfaces, more densely so when immature, the lobes entire or more usually incised, the teeth all acute at the apex; midrib and the 1--3 pairs of secondaries very tenuous, plane or obscure above, very slightly prominulous beneath; veinlet reticulation indiscernible above, obscure beneath; inflorescence terminal and in the uppermost leaf-axils, the floriferous portion congested-spicate, densely many-flowered, apparently 2--3.5 cm. long, showy; peduncles very slender, 6--10 cm. long, rather obtusely tetragonal, sometimes slightly sulcate, stramineous, fairly densely short-pilose or strigillose with whitish reflexed hairs; bractlets lanceolate, 4--6 mm. long, about 1 mm. wide at the base, long-attenuate at the apex, rather densely strigose with antrorse white hairs; calyx cylindric, 8--9 mm. long, densely strigose with closely appressed, antrorse, white hairs, its rim unequally toothed, the teeth long-aristate, their tips connivent before and after anthesis, purplish; corolla violet or purple, its tube 10--11 mm. long, glabrous or very obscurely pilosulous above the calyx outside, villous at the throat within, the limb 7--8 mm. wide, patent, the lobes deeply cordate at the apex, glabrous on both surfaces.

The type of this most interesting species was collected by Robert E. Fries (no. 477) in shady places under Salix humboldtiana at Piquete, on the sandy banks of the Río San Francisco, Jujuy, Argentina, on August 21, 1901, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The species reminds one in the general appearance of its leaves of the North American V. canadensis (L.) Britton. It is named in honor of Philip Cheitman, American educator and ardent student of Nature, who has rendered considerable help to me in my researches on tropical and extra-tropical American plants.

The species has been found on hillsides as well as on sandy riverbanks, at altitudes of 450 to 3300 meters, blooming in February, April, and November. The Formosa, Argentina, record given by me in my Known Geogr. Distrib. Verbenac., [ed. 2], 105 (1949) and Résumé 127 (1959) was based on Morel 1003 and 1214, but these two collections are now regarded by me as representing V. calliantha Briq. The Jürgensen 86 cited below could be from the provinces of Buenos Aires, Córdoba, Entre Ríos, San Luis, or Santa Fé, since there is a "Saladillo" locality in each of these provinces.

In all, 11 herbarium specimens, including the type, and 5 mounted photographs have been examined by me.

Citations: ARGENTINA: Catamarca: Brucher & Brucher s.n. [16/2/1949] (Lu). Jujuy: R. E. Fries 477 (F--photo of type, N--iso-

type, N--photo of type, Pc--photo of type, S--type, S--isotype, S--isotype, Si--photo of type, Z--photo of type); Schreiter 5149 [Herb. Osten 20012] (N, Ug); Venturi 5132 (W--1591462). Salta: Venturi 5329 (W--1591469). Tucumán: Venturi 7785 (W--1591389). Province undetermined: Jørgensen 86 [El Saladillo] (W--921685).

VERBENA CHILENSIS Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44, 78, & 101, hyponym (March 12, 1942); Lilloa 8: 429. 1942.

Synonymy: Verbena glabrata R. A. Phil., Anal. Univ. Chil. 35: 190--191 [Sert. Mendoc. Alt. 32]. 1870 [not V. glabrata H.B.K., 1818].

Bibliography: H.B.K., Nov. Gen. & Sp. Pl. 2: 276--277. 1818; R. A. Phil., Anal. Univ. Chil. 35: 190--191 [Sert. Mendoc. Alt. 32]. 1870; Jacks., Ind. Kew. 2: 1178. 1895; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44, 78, & 101. 1942; Moldenke, Lilloa 8: 429 (1942) and 10: 382. 1944; Moldenke, Alph. List Cit. 4: 1080, 1172, & 1198. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 197. 1949; Moldenke, Phytologia 4: 71. 1952; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 127, 364, 419, & 471. 1959.

Semiprostrate shrub or suffrutescent, completely glabrous throughout; branches 23--30 cm. long; upper internodes about twice as long as the leaves; leaves up to 26 mm. long and 15 mm. wide, the uppermost ones entire, the middle ones mostly simply 3-fid, cuneate at the base, with linear obtuse segments 2--3 mm. wide, the lowermost often with the lateral segments again divided into 3 small lobes; spikes exserted, capitate, many-flowered; bractlets lanceolate-subulate, shorter than the calyx; calyx 9--10 mm. long, glabrous; corolla yellow or yellow and purple or pale-purple, 21--23 mm. long, glabrous; anther-appendages clavate, exserted.

The type of this species was collected by Rudolf Amandus Philippi in Mendoza, Argentina, sometime in 1868 and is deposited in the herbarium of the Museo Nacional de Historia Natural de Chile in Santiago. Unfortunately, the label of Macbride's widely distributed photograph 17417 of an isotype does not show Philippi's original label and is erroneously inscribed "Chile" -- which is the basis for the misleading specific epithet which I chose for the species when it was discovered that Philippi's original epithet had to be discarded because it is a later homonym.

The Gillies s.n. [Mendoza] specimen cited below from the Lund herbarium is labeled as Verbena flava Gill. & Hook. in the same style and manner as are the actual isotypes of that species in the same herbarium, but its leaves are plainly 3-partite, Carette 339 and Sanzin 582 were previously misidentified as V. flava, while Sanzin 855 was identified as V. flava with "V. glabrata Phil." given as a possible synonym. Philippi, however, states that his species is distinguished from V. flava, which also is

glabrous and has yellow flowers, by its parted leaves, the corolla being twice as large, and by the thick club-shaped anther-appendages; from *V. radicans* Gill. & Hook. by its much less parted leaves, perfectly glabrous calyx, and other characters; and from all other species with which it could be compared by its glabrous condition.

V. chilensis has been found on mountain ridges above the barrel-cactus zone, in sandy places, and in quebradas, from 1480 to 3200 meters altitude, flowering from November to March, and fruiting in January. In all, 33 herbarium specimens and 5 mounted photographs, including phototypes of both names involved, have been examined by me.

Citations: ARGENTINA: Mendoza: F. A. Barkley 20Mz072 (N); H. H. Bartlett 19410 (W—1904486), 19487 (M, W—1907597); Carette 339 (N), s.n. [Ruiz Leal 2563] (N); Gillies s.n. [Hornillos] (Bm), s.n. [Mendoza] (Lu); O'Donell 1026 (N); R. A. Philippi s.n. [Mendoza; Herb. Mus. Nac. Hist. Nat. Chile 42446 & 54790; Macbride photos 17417] (Kr—photo of isotype, N—photo of type, N—photo of isotype, N—photo of isotype, N—photo of isotype); Rossi 362 (N); Ruiz Leal 3505 (N), 3628 (N), 4686 (N, Ss), 5367 (N), 7702 (N), 8584 (N), 8650 (Rl), 10489 (N), 11232 (Ss), 11674 (Z), 16964 (Ss); Sanzin 582 [Herb. Osten 12807] (Ug), 855 [Herb. Osten 12808] (Ug), s.n. [Ruiz Leal 1410] (N), s.n. [Ruiz Leal 1411] (N); Semper s.n. [Ruiz Leal 4259] (N), s.n. [Ruiz Leal 10565] (Ss), s.n. [Ruiz Leal 11201] (Ss), s.n. [Ruiz Leal 13812] (Rl). Neuquen: Fabris 842 (N); O'Donell 2008 (Er, S).

VERBENA CILIATA Benth., Pl. Hartw. 21. 1839.

Synonymy: *Verbena candelabrica* W. Schum., in herb. *Verbena erinoides* H.B.K., in herb. [not *V. erinoides* Auth., 1959, nor Chod., 1904, nor Hook., 1959, nor Hook. & Arn., 1959, nor L., 1959, nor Lam., 1791, nor Poepp., 1847, nor Spreng., 1830].

Bibliography: Benth., Pl. Hartw. 21. 1839; Walp., Repert. Bot. Syst. 4: 30. 1845; Schau. in A. DC., Prodr. 11: 550 & 553. 1847; S. Wats., Proc. Am. Acad. Sci. 18: 136. 1883; Coult., Contrib. U. S. Nat. Herb. 2: 327—328. 1892; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148. 1894; Jacks., Ind. Kew. 2: 1178. 1895; Small, Fl. Southeast. U. S., ed. 1, 1010. 1903; Briq., Ann. Conserv. & Jard. Bot. Genève. 10: 102. 1907; F. E. Lloyd, Carnegie Inst. Wash. Publ. 82: pl. 3. 1908; Small, Fl. Southeast. U. S., ed. 2, 1010. 1913; E. D. Schulz, 500 Wild Fls. 178. 1922; E. D. Schulz, Texas Wild Fls. 336—337. 1928; Seymour, Host Ind. Fungi N. Am. 587. 1929; Stapf, Ind. Lond. 6: 429. 1931; Perry, Ann. Mo. Bot. Gard. 20: 248, 249, 312, 325, 330—331, 336, & 355. 1933; J. A. Harris, Physico-chem. Prop. Plant Saps 49. 1934; L. H. & E. Z. Bailey, Hortus, new rev. ed., 632. 1935; L. H. Bailey, Cat. Florists Handl. Verbenac. mss. 1935; Sperry, Sul Ross Bull. 19: 68. 1938; Ranson, Texas Wild Fl. Legends 113. 1940; Sperry, Sul Ross Bull. 22: 41. 1941;

Worsdell, Ind. Lond. Suppl. 2: 486. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 18 & 43--44. 1942; H. S. Gentry, Carnegie Inst. Wash. Publ. 527: 221 & 306. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 7, 8, 11, 13, 14, 18, & 101. 1942; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Moldenke, Bot. Gaz. 106: 161. 1945; Moldenke, Am. Journ. Bot. 32: 610. 1945; Moldenke, Phytologia 2: 66, 79, 114, & 127. 1945; W. C. Leavenworth, Am. Midl. Nat. 36: 148 & 187. 1946; Moldenke, Alph. List Cit. 1: 4, 37, 53, 89, 104, 122, 126, 127, 136, 143, 144, 152, 216, 233, 244, 253, & 283. 1946; G. L. Fisher, Am. Bot. Exchange List 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 24. 1947; Moldenke, Phytologia 2: 328 & 331 (1947) and 2: 161. 1948; Moldenke, Wrightia 1: 234. 1948; Moldenke, Castanea 13: 112 & 114. 1948; Moldenke, Alph. List Cit. 2: 370, 439, 457, 467, 473, 475, 477, 479, 483, 497, 483, 497, 498, 506, 517, 522, 523, 525--527, 531, 540, 549, 588, 595--598, 607, & 626 (1948), 3: 656, 678, 697, 714, 730, 731, 740, 753--755, 767, 769, 772, 785, 787, 799, 802, 803, 828--831, 849, 871, 879, 881, 883, 898, 933, 934, 951, 963, & 973 (1949), and 4: 986, 991, 996, 997, 1002, 1003, 1014, 1072, 1075, 1082, 1108, 1121, 1148, 1153, 1158, 1160, 1166, 1169--1171, 1182, 1192, 1199, 1211, 1221, 1229, 1231, 1241, 1247, 1290--1292, 1294, 1295, & 1303. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 14, 16, 21, 23, 25--27, 32, 34, 36, & 197. 1949; Moldenke, Phytologia 3: 73 & 132. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; McDougall & Sperry, Pl. Big Bend Nat. Park 146. 1951; J. Rzedowski, Anal. Esc. Nac. Cienc. Biol. 8: 112. 1954; Moldenke, Inform. Mold. Set 49 Spec. 3. 1954; Moldenke, Phytologia 5: 95. 1954; J. Rzedowski, Anal. Inst. Biol. Mex. 27: 201. 1956; J. & G. C. de Rzedowski, Act. Cientif. Potos. 1: 39. 1957; Moldenke, Résumé 18, 20, 26, 29, 31, 33, 39, 40, 43, 364, & 471. 1959; J. Rzedowski, Act. Cientif. Potos. 4: 91. 1960; Lewis & Oliver, Am. Journ. Bot. 48: 639--641. 1961; Moldenke, Résumé Suppl. 3: 8 (1962) and 5: 4. 1962.

Illustrations: F. E. Lloyd, Carnegie Inst. Wash. Publ. 82: pl. 3. 1908; E. D. Schulz, Texas Wild Fls. 336. 1928; Lewis & Oliver, Am. Journ. Bot. 48: 640. 1961.

Erect or ascending summer annual or perennial herb, various in form, often sprawling, semi-prostrate, or prostrate, spreading, sometimes 60 cm. tall, subcanescent throughout; stems several from a common base, usually decumbent, branched, hirsute-hispidulous; branches villous-hirsute; leaves short-petiolate or sessile, about 2.5 cm. long, subbipinnatifid or commonly trifid, with the divisions more or less deeply incised, hirsute-strigillose or strigose-hispidulous on both surfaces, the middle divisions pinnatifid or subbipinnatifid, the lateral ones mostly bifid, the ultimate segments linear-oblong, about 2 mm. wide, acutish at the apex, with slightly revolute margins; spikes sessile or short-pedunculate, dense, elongate during anthesis, more or less compact in fruit, hispid-hirsutulous and glandulose; bractlets a little shorter or one-third shorter

than the calyx, lanceolate, acuminate or subulate at the apex, hirsute-ciliate; flowers showy, with a faint fragrance of lilac (*Syringa vulgaris* L.); calyx 6--8 mm. long, somewhat glandulose, hirsute-hispidulous, its lobes 5, short, unequal, subulate; corolla showy, varying from red, reddish-purple, pink-lavender, pink-purple, purple, magenta, or pink to lilac-purple, violet, violet-purple, lavender, light-lavender, pale-violet, violet-blue, blue-purple, pale-blue, or blue, sometimes merely tinged pink, much longer than the calyx, its tube slender, one-third longer than the calyx, 10--12 mm. long, pubescent on the outer surface, barbate at the mouth, the limb medium-large, 6--8 mm. wide, the lobes obtuse or retuse, the lowest emarginate; dorsal anther-appendages minute; cocci 2.5--3 mm. long, reticulate-scrobiculate above, striate toward the base, the commissural faces muricately scabrous; chromosome number: $n = 15$.

The type of this species was collected by Carl Theodor Hartweg (no. 176) at Leon, Guanajuato, Mexico, in 1839. Walpers classifies the species in his Sect. *Verbenaca* Walp., Subsect. *Inermes* Walp., Group *Foliosae* Walp., Subgroup *Macranthae* Walp., and Secondary Subgroup *Aubletia* (Neck.) Walp., along with ten other species. The type of *V. candelabrica* was collected by Walter Schumann (no. 1071) at Feral, Mexico.

It is worthy of note here that *V. ciliata* var. *nepetifolia* Tidestr. is *V. gooddingii* var. *nepetifolia* Tidestr. The *V. erinoides* of Chodat is *V. calliantha* Briq., of Lamarck is *V. laciniata* (L.) Briq., of Hooker, of Hooker & Arnott, of Linnaeus, of Poeppig, and of Sprengel is *V. berterii* (Meisn.) Schau., and of "Authors" is *V. dissecta* Willd.

The species inhabits gravel, loose gravelly or moist adobe soil, volcanic and volcanic ash soil, gravelly volcanic and silty-gravelly soil, and moist brownish sandy loam in open scrublands, pinelands, oak- and mesquite-grasslands, xeric scrublands, high mountain meadows, wet meadows, open plains, cropped hillsides, burned-over pinelands, thin-soiled rocky slopes, foothills, valleys, hills, mountains, volcanos, bare hills, dry hills, and mesas. It has been found by collectors in black soil along roadsides, in sandy soil on roadbanks, in waste places, dry gulches, dry land, and dry situations in general, in arid or sparsely wooded grasslands, sinks in flats, deserts, fields and weedy fields, and meadows, on gypsum flats, gentle rocky volcanic slopes, caleche slopes of mountain valleys, plains, gravelly brush-covered and sandy plains, sandy flats, sandy valley land, grassland with scattered pines or with stony outcrops, rocky canyon walls, and limestone hills, on transition pine slopes and open deserts, at the edge of cienaga, on grassy stony flats, gravelly hillsides in deserts, large open meadows and cienagas surrounded by pine forests, and along roadsides. In Texas it is said to grow on flats and plains and along roadsides, growing in patches, but never in extended areas like *V. bipinnatifida* Nutt.;

Warnock describes it as "infrequent on flats" in Brewster County, while Runyon says it is "common" in Cameron County. Gregory & Eiten found it prostrate in grazed grass of heavily grazed area in the Federal District of Mexico, while Muller found it "sparse on grassy slopes" in Chihuahua and Feddema "occasional in loam soil in open sun or partial shade" in Nayarit. Maysilles calls it a "rather common roadside weed". Gentry states that it is found on warm slopes in pine forests, locally abundant with Stevia, Linum, and Geranium in the Lower Pine Forest district of Chihuahua, while Martinez says that it grows in "suelo arenoso con grava superficial y subsuelo profundo, vegetacion Bouteloua eriopoda dominante, pastival de B. gracilis deteriorado." Stanford, Retherford, & Northcraft found it on a valley floor sparsely covered with Yucca and Larrea on the Coahuila-Zacatecas border, and in playa valleys with considerable drainage from the surrounding hills, with Larrea, Acacia, and herbaceous weeds common, in Coahuila. McVaugh encountered it as occasional on brush-covered hills among shrubs and small trees (e.g., Acacia, Mimosa, Opuntia) in Agua Calientes.

In Nuevo Leon it is said to be abundant on open rocky slopes, while Mueller & Mueller report it "scattered in open woods of broad canyon". King says that it is abundant in sandy loam, in open sun, in Puebla, while in Durango it is a "rather common roadside weed" and grows on "steep canyon walls and shaded cool moist ravines" according to Maysilles.

It has been collected at altitudes of 30 to 11,800 feet, blooming and fruiting from February to November. Runyon reports that in Cameron County, Texas, it "flowers in spring, showy, nearly red to pure purple". In that state it is found from Llano and Burnet Counties, south to Webb and Cameron, east to Polk, and west to Brewster Counties. In Arizona it was found by Bohrer in clay-like soil with grama and annual weeds. Vernacular names reported for it are "alfombrilla", "alfombrillo", "alfornbrilla", "chinatú", "moradilla", "verbena", "vervain", and "wild verbena".

Schauer (1847) compares the species with V. pogostoma Klotzsch as follows: "Mire similis V. ciliatae, vero tamen distincte pube, fol. laciniis magis elongatis, corolla et antheris super. omni vestigio appendicis carentibus." McDougall & Sperry (1951) state that V. ciliata can be distinguished from V. bipinnatifida in that it has "the stems more likely to be partly prostrate, the leaves are only once or twice cleft, and the flowers are somewhat smaller, often less than one-fourth inch across." Perry (1933) notes that "This is a variable and wide-ranging species closely related to the bipinnatifida-Wrightii-ambrosifolia complex and scarcely capable of sharp delimitation. Its best characters are the hirsute-hispid pubescence, the usually sessile compact spike, the medium-short somewhat glandular calyx subtended by a slightly shorter bract. The specimens, Seaton 150, Pringle 9313, and Gregg 648, have typical spikes, but the leaves are small and the stems tend to be repent, suggesting a possible intergradation with

V. teucრიifolia." A note on Edw. Palmer 36 in the United States National Herbarium states that "The seed has the commissure scabrous, as in specimens of *V. Aubletia*."

Seeds of *V. ciliata* are offered to the horticultural trade by D. M. Andrews at Boulder, Colorado. The F. Miranda s.n. [10 Julio 1946] specimen cited below is actually a seed voucher. The physicochemical properties of the plant sap of this species in relation to phytogeography are discussed by Harris (1934), based on a specimen collected in a small arroyo near the Desert Laboratory, along the west wash, Tumamoc Hill, at Tucson, Arizona.

The species is sometimes infected by the fungi *Dicaeoma sarco-bati* Arth. and *Puccinia subnitens* Diet. according to Seymour (1929). Specimens have been misidentified in herbaria and distributed as *Verbena ambrosiaefolia* Rydb., *V. ambrosifolia* Rydb., *V. ambrosiifolia* Rydb., *V. ambrosifolia* f. *eglandulosa* Perry, *V. andrieuxii* Schau., *V. arizonica* A. Gray, *V. aubletia* Jacq., *V. bipinnatifida* Nutt., *V. bipinnatifida* (Nutt.) Schau., *V. bipinnatifida* Schau., *V. bipinnatifidus* Nutt., *V. bracteata* Michx., *V. ciliata* var. *longidentata* Perry, *V. ciliata* var. *longidentata* Perry, *V. ciliata* var. *pubera* (Greene) Perry, *V. elegans* H.B.K., *V. elegans* var. *asperata* Perry, *V. exilis* Schau., *V. gooddingii* Briq., *V. gracilis* Desf., *V. multifida* Ruiz & Pav., *V. prostrata* R. Br., *V. pubera* Greene, *V. racemosa* Eggert, *V. teucრიifolia* Mart. & Gal., *V. teucრიifolia* var. *corollulata* Perry, *V. wrightii* A. Gray, and even *Collomia heterophylla* Hook. in the *Polemoniaceae* and *Datura* sp. in the *Solanaceae*!

On the other hand, the G. L. Fisher 18, Griffiths 4244 and 5515, Peebles & Smith 13972, Warnock & McBryde 14750, Wooton & Standley 3691, and Zuck s.n. [Holbrook, Aug. 16, 1896], s.n. [Taylor, Aug. 1, 1897], and s.n. [Holbrook, Oct. 9, 1897], distributed as *V. ciliata*, are all *V. ambrosifolia* Rydb.; Blankinship s.n. [Huntsville, Apr. 16, 1896], Collom 248, Kearney & Peebles 13983, and Edw. Palmer s.n. [Willow Spring, May 1890] are *V. bipinnatifida* Nutt.; Donnelly 5 is *V. bipinnatifida* var. *latilobata* Perry; G. L. Fisher 41 is *V. canadensis* (L.) Britton; R. Runyon 630, Rose & Rose 11398, Ruth 110 (in part), and E. D. Schulz 845 are *V. ciliata* var. *longidentata* Perry; J. Skehan 5 and Toumey s.n. [Chiricahua Mts., Apr. 5, 1897] are *V. ciliata* var. *pubera* (Greene) Perry; Hotchkiss 6184, Edw. Palmer 1045, R. Runyon 327, and Wiggins 6288 are *V. delticola* Small; the L. H. Hooker 5999, distributed as "*V. sp. aff. V. ciliata*", is also *V. delticola* Small; Purpus s.n. [1907] is *V. elegans* H.B.K.; Edw. Palmer 51 and 295, Purpus 4974, M. Taylor 129, and S. S. White 4178 are *V. elegans* var. *asperata* Perry; K. Brandegee s.n. [Cima, June 1915], T. S. Brandegee s.n. [Las Durasnillas, May 18, 1892], J. I. Carl-

son s.n. [South of Warren, June 7, 1915], Crosswhite & Sands 788, Eastwood 18032, Goodding 2231, F. W. Gould 4707, Kearney & Peebles 11100, and Edw. Palmer 339 and 340, as well as N. C. Wilson 99 and Wooton s.n. [Kingman, Mch. 11, 1912], are all V. gooddingii Briq.; T. S. Brandegees s.n. [Vallederos Ck., May 4, 1893] and s.n. [Agua Dulce, May 16, 1889], Crosswhite 515, M. E. Jones 3901, C. R. Orcutt 1303, s.n. [10-6-1882], s.n. [10-5-1882], and s.n. [Rosario, 5/3/1886], Rose, Standley, & Russell 15176, Rothrock s.n. [Tucson], and N. C. Wilson 37 and 95 are all V. gooddingii var. nepetifolia Tidestr.; the Vasey s.n. [Tucson, 1881], distributed as "V. aubletia or ciliata", is also V. gooddingii var. nepetifolia Tidestr.; Lindheimer 1075 and III.501, Ruth 110 (in part), and C. Wright 1500 are V. pumila Rydb.; Edw. Palmer 1045 is V. quadrangulata Heller; Roane 28 is V. racemosa Eggert; I. J. C. s.n. [Nov. 22, 1907] is V. robusta Greene; Pringle 4180 & 13792 and Rose & Hough 4484 are V. teucrifolia Mart. & Gal.; Parry & Palmer 719 and Purpus 137 are V. teucrifolia var. corollulata Perry; and Griffiths 5190 and Nelson & Nelson 5017 are V. wrightii A. Gray.

The Clemens & Clemens 976, previously determined as V. ciliata, is actually V. pumila Rydb. The State College of Washington specimen of Nelson & Nelson 1364 has the corolla about equal to the calyx in length and is here cited under V. gooddingii, but the University of Washington specimen of the same number shows the corolla much longer than the calyx and is here regarded as V. ciliata. The Fox J.7 specimen of V. ciliata was originally mounted on the same sheet with Nelson & Nelson 1429, which is V. gooddingii. Parry & Palmer 719 is a mixture with V. teucrifolia var. corollulata Perry, Warnock T.66 is a mixture with V. wrightii A. Gray, Stanford, Retherford, & Northcraft 498 and Waterfall & Wallis 13806 are mixtures with V. canescens H.B.K., and Burnham 305 is a mixture with Phacelia sp. (Polemoniaceae).

J. I. Carlson s.n. [Douglas, May 13, 1915] was determined by Kearney as being in part V. ambrosifolia and in part V. bipinnatifida, but I think that it is all V. ciliata or V. ambrosifolia f. eglandulosa Perry. Worth & Priest 585 is doubtfully placed here — its flowers are unusually large for this species. The H. S. Barber 106, Griffiths 4757, W. Hough 109, Peebles 5353, Toumey 305 1/2, and Zuck s.n. [Snowflake, July 30, 1897], cited below, were all annotated by Kearney as "V. wrightii?" The Wynd & Mueller 450 specimens cited under V. bipinnatifida Nutt. will probably, on re-examination, prove to be V. ciliata.

It should be noted here that Coulter, Contrib. U. S. Nat. Herb. 2: 327 is cited as "1894" in Lundell, Fl. Texas 3 (1): 43 (1942), but this page seems actually to have been published in 1892.

Adams has appended a note to his South Dakota specimen cited below: "The little spec. I send of Verbena Bipinnatifida is not a fair sample of the pretty plant, wh. in a good season forms round mats bright with bloom, by dusty roadsides: some have a striped petal." His specimen seems to be V. ciliata.

The following notes by Cory are of particular interest -- in speaking of his no. 35568, cited below, he says: "This is the white-flowered verbena growing in the Ft. Stockton, Sanderson, and Marathon country, and which has been determined for me before as V. pumila (to which I objected) and as V. racemosa. Of these three I favor V. ciliata. In the FLORA OF TEXAS I note that you do not give this plant as having a white corolla -- almost everything but white; whereas our plant almost always has a white corolla. In age there is a suggestion of purplish coloration. This species grows in abundance in highly calcareous soils, is of prostrate growth, and usually makes rather a limited growth. It may have a connection with V. racemosa or with V. ciliata, if it is not V. ciliata itself. This number was of one plant only and was from a draw about two miles west of the Glass Mountains." It is possible that this plant should be given a form name, since it is the only specimen seen by me where the collector states the corolla to be white. Usually the white-flowered specimens from western Texas have proved to be V. racemosa Eggert.

Schauer (1847) cites C. Ehrenberg 1242 and Hartweg 176, both from Mexico, in the Berlin herbarium, now doubtless destroyed. Perry (1933) cites "Kuntze 424" from Zacatecas in the Britton Herbarium, but this is almost certainly a typographic error for Kuntze 23424. She cites the following 66 additional specimens not as yet seen by me: NEW MEXICO: County undetermined: Mearns 108 (G). ARIZONA: Maricopa Co.: M. E. Jones 26231 (E). MEXICO: Chihuahua: Gregg s.n. [April 28/47] (E, G); Edw. Palmer 79 (E, F, G), 281 (G); Pringle 1117 (F). Coahuila: Gregg 26 (E), 57 (E), 257 (E); Edw. Palmer 74 (E, F, G); Purpus 4524, in part (E, F). Durango: Gregg 632 (E); Nelson 4559 (E), 4604 (E); Edw. Palmer 345 (E, F, G), 401 (E, F, G). Federal District: Bourgeau 120 (G); Pringle 9313 (E, G). Guanajuato: Duges 496 (G), 496a (G); Hartweg 176 (G--isotype). Jalisco: Furness s.n. [Guadalajara, Aug. 1909] (F); Edw. Palmer 35 (G, W); Pringle 11091 (E, F). México: G. L. Fisher 319 (E), s.n. [Amecameca, 24 July 1924] (F); Gregg 648 (E); Pringle 13158 (F, G). Michoacán: Gregg 756 (E); Seler 1174 (G). Nayarit: M. E. Jones 23244 (E); Edw. Palmer 2055 (W). Oaxaca: Seler 1379 (G). Puebla: C. C. Deam 86 (G), s.n. [Cholula, Jan. 1, 1879] (F); Purpus 3407 (E, G). Querétaro: Ar-sène & Agniel 10252 (E, F, G). San Luis Potosí: Parry & Palmer 719, in part (D, E); Schaffner 717 (D, G). Sonora: Thurber 769 (G). Vera Cruz: Seaton 150 (F, G), 391 (F, G, W). State undetermined: Coulter s.n. (D); Schumann 1071 (G). The Rose & Rose

11398 which she cites is var. longidentata Perry. She has appended a note to the U. S. National Herbarium specimen of H. E. Seaton 319: "The number of this collection in Gray Herb. and Columbia College Herb. is 391". This is probably the collection which she cites as "391" from Gray Herbarium, Chicago Museum of Natural History, and the United States National Herbarium. The United States National Herbarium specimen of Pringle 13158 bears a label which was originally inscribed "13155". Her "Arsène & Agniel 10252" is cited hereinafter as Agniel s.n. [Arsène 10252]. She cites Halsted s.n. and Nelson 223 & 242 as V. teucrifolia Mart. & Gal., but I think that they are V. ciliata. Probably the other hirsute collections which she mentions under V. teucrifolia are also V. ciliata, or a hybrid between the two species.

In all, 403 herbarium specimens, including the type material of both names involved, have been examined by me.

Citations: TENNESSEE: Davidson Co.: Michaux s.n. [in urbe Nashville] (C). SOUTH DAKOTA: Hughes Co.: L. Adams s.n. [June 27/94] (Ur). OKLAHOMA: Beaver Co.: G. W. Stevens 346 (Ur). TEXAS: Brewster Co.: Cory 35568 (N, N); Warnock T.66, in part (Au), W.284 (N), W.625 (Au). Brooks Co.: C. L. Lundell 10825 (N, Rf). Burnet Co.: Tharp s.n. [Granite Mt., 4-13-1930] (Au, Mi, N). Cameron Co.: R. Runyon 1010 (Rr), s.n. [Brownsville, 1930] (Hp). Edwards Co.: Cory 38871 (N, N). Hall Co.: R. W. Bennett 44 (Tr--19290). Hansford Co.: Headlee 66 (Ar--99346). Llano Co.: M. E. Jones 29190 (Po--199872). McMullen Co.: F. A. Barkley 16T301 (Au, N, S). Polk Co.: Parks & Cory 5611 (Tr). Ward Co.: T. A. Williams s.n. [Pyote, May 19, 1900] (W--519877). Webb Co.: Hamby 500 (Ar--206657); Herb. Univ. Texas s.n. [Laredo, 2-27-30] (Au). County undetermined: G. A. Black 38-4721 (N); Herb. Univ. Texas s.n. (Au). NEW MEXICO: Bernalillo Co.: J. Lauber 101 [4483] (S). Catron Co.: Shreve 8279 (Ca--882845). Grant Co.: Mulford 896 (Ur); W. Stewart s.n. [Pinos Altos, June 26, 1936] (Bl--42330, La, Mi). Lincoln Co.: Hitchcock, Rethke, & Raadshooven 4264a (Se--44821); Worth & Priest 535 (Ba), 585 (N). Santa Fe Co.: J. R. West 13216 (S). Socorro Co.: Ferris & Duncan 2292 (Gg--31430). Valencia Co.: Nelson & Nelson 2187 (I). County undetermined: Ehlers & Ehlers 6307 [Wilma] (Mi); Mearns 108 [Upper Corner Monument 31°47'] (N). ARIZONA: Cochise Co.: Carlson s.n. [Douglas, May 13, 1915] (Gg--31274); Peebles 5353 (W--1435050); W. W. Price s.n. [Apr. 21, 1894] (Du--97118), s.n. [June 1894] (Du--97117); J. J. Thornber 2671 (Tu), 7121 (Tu); Toumey s.n. [Cave Creek, 6/25/40] (Cm). Coconino Co.: Deavers 3133 (Fg), 3134 (Fg); Ehlers & Ehlers 6690 (Mi); Ensor 47 [111] (Fg); A. Nelson s.n. [Schnebly Hill, 5/23/40] (Fg). Gila Co.: R. E. Beckett 10023 (To, W--1624480); E. H. Graham 3789 (Cm); Shreve 7451 (Mi). Graham Co.: Bohrer 335 (Gg--

377373); Herb. Soil Conserv. Serv. 261 (Tu); Munz 1249 (Po--123800); Peebles 12989 (N). Greenlee Co.: L. D. Benson 9467 (Ca--777728). Maricopa Co.: M. E. Jones 26231 (Du--235288, Gg--237863, I, La, La, Mn--22401, Po--178357, W--1635813); Peebles & Loomis 6732 (I). Mohave Co.: M. E. Jones s.n. [Peach Springs, June 15, 1930] (I); L. S. Rose 40079 (Bt--59604, We). Navajo Co.: W. Hough 109 (W--564915); Zuck s.n. [Snowflake, July 30, 1897] (W--664467). Pima Co.: Burnham 305 (I); J. L. Fox J.7 (N); H. W. Graham 7-9-6 (Cm), 8-5-37, in part (Cm); Nelson & Nelson 1364, in part (Se--16882); K. F. Parker 5913 (Ca--737088). Yavapai Co.: H. S. Barber 106 (W--499203); Demaree 41126 (Gg); Griffiths 4757 (W--496411); W. W. Jones s.n. [Prescott, May 30, 1922] (Ca--407939); Toumey 305 1/2 (Tu, W--212337), s.n. [7-30-1891] (Ca--882633, Tu). County undetermined: S. B. Parish s.n. [July 1882] (Ca--192065). CALIFORNIA: Los Angeles Co.: G. Hall s.n. [Pomona, Feb. 1927] (Hp). MEXICO: Aguas Calientes: McVaugh 16634 (Mi); Rose & Painter 7742 (W--451359). Chihuahua: Correll & Johnston 21457a (Ld), 21525 (Ld), 21731 (Ld); B. M. Dobie 35 (N); H. S. Gentry 2758 (Fs); Gregg s.n. [April 28/47] (T); Herb. Inst. Biol. Univ. Nac. Mex. 2018 (Me); Knobloch 251 (Ok), 1009 (Mi, W--2215050); Martinez M. 17 (Au--181443); Mexia 2537 (Ca--442675, Gg--286730, I, Mi, N); C. H. Muller 3347 (Mi); Edw. Palmer 79 (N, S, W--573554), 281 (N, W--573747); F. W. Pennell 19252 (N, W--1641569); Pennington 28 (Au--180080), 366 (Au--121728); Pringle 1117 (C, Me, Me, Vt, W--154994), 19252 (Me); Shreve 7926 (Fs, Mi, W--1822628); Thurber 317 (N); S. S. White 2042 (Mi, W--1822864), 2043 (S), 2167 (Mi); E. Wilkinson 142 (W--1323049), s.n. [Santa Eulalia plains, Sept. 26, 1885] (Ca--192063, Ob--50863, W--147560, W--221202). Coahuila: Aguirre & Reko 58 (N); Arsène 3384 (N); O. M. Clark 6709 (Ok--18720); Correll & Johnston 21343 (Ld), 21344 (Ld); G. L. Fisher 223 (W--1316037); F. W. Gould 6441 (Mi); Herb. Inst. Biol. Univ. Nac. Mex. 7138, in part (Me); Hernandez Corzo, Rowell & Barkley 16M488 (Au, N); Kenoyer & Crum 2654 (Mi); Lewis & Oliver 5417 (Nb); E. G. Marsh 1188 (St); E. W. Nelson 3920 (W--266881); Edw. Palmer 74 (Ca--104878, Me, N, W--336067); Purpus 1095 (Ca--138827, N), 4524 (Ca--144793); Rose & Painter 6431 (W--451710); Stanford, Retherford, & Northcraft 241 (N), 498, in part (Du--291315, Se--70451, Tu--11303); Waterfall & Wallis 13276a (St); S. S. White 2018 (Mi, Tu--35532); White & Chatters 206 (Mi); Wynd & Mueller 450 (I, N, W--1639871). Colima: M. E. Jones 686 (Po--243637). Durango: Correll & Johnston 20044 (Rf); G. L. Fisher 44260 (N), s.n. [Tepehuanes, July 28, 1944] (Ew); H. S. Gentry 6870 (Mi); Maysilles 7039 (Mi, N, W--2215262), 7057 (Lm, N), 7684 (W--2215337), 7879 (Mi), 8262 (Mi), 8462 (Mi); E.

W. Nelson 4559 (W--332582), 4604 (W--332620); Edw. Palmer 345 (Ca--104829, N, W--304176), 401 (Ca--139762, N, W--571426); Shreve 8797 (Fs, Mi, W--1749333); Waterfall 15403 (St); Waterfall & Wallis 13409 (St), 13551 (St). Federal District: Bourgeau 120 (Br, Cb, S); Bravo Hollis 7138 (Me); Degener & Degener 26182 (N); Gregory & Eiten 51 (Mi); F. Miranda s.n. [10 Julio 1946] (N); Miranda & Barkley 16M989 (Au, N, N); Moldenke & Moldenke 19846 (N); Pringle 9313 (N, Vt, W--396429); B. P. Reko 4687 (Me); Schiefer 99 (Mv); E. Wall 4 [1/5/28] (Ew), 4 [2/5/28] (Ew); Zamora, Paxson, & Barkley 16M872 (Au). Guanajuato: Barkley, Rowell, & Paxson 722 (Au--123263), 757 (Au--123224, N); Barkley, Webster, & Paxson 722 (N); G. L. Fisher 207 (W--1316025), s.n. [July 28, 1926] (Du--154567); Hartweg 176 (N--isotype); Spivey 169 (Ca--916746); Yates & Wilcox 86 (Ak--31229). Guerrero: Richards & Rowell 3295 (Cb); Wilkinson & Rowell 3394 (Cb). Hidalgo: O. M. Clark 7044 (N); Collector undesignated 106 (Q); L. I. Davis 231 (N); M. Martinez s.n. [Cerca de Pachuca, Nov. 1945] (N); Moldenke & Moldenke 19841 (N); Pringle 7591 (Po--63869); Schiefer 15 (Mv). Jalisco: Bárcena 180 (Me); Furness s.n. [Guadalajara, August 1909] (W--1430142); P. Goldsmith 6 (Ca--924023, W--1842357); Edw. Palmer 35 (Bm, C, Pa, Sg--16098), 36 (W--56164); Pringle 11091 (Cm, Me, Me, N, Vt, W--460473); Safford 1398 (W--573395); Valentin 226 (Me); Weintraub & Roller 121 (Mi), 152 (Mi). México: G. L. Fisher 319 (W--1207408); Fröderström & Hultén 1200 (N, S); Hinton 4362 (N, W--1822223); F. W. Johnson s.n. [Amecameca, Oct. 1, 1906] (N); MacDaniels 509 (Ba), 546 (Ba); Matuda 21323 (N); Paxson & Barkley 16M827 (Au); Pringle 13158 (Gg--421276, Mi, Tu--35533, Vt, W--461755, W--1586475). Michoacán: Eggler 49 (W--2216815); Hinton 11914 (Mi); E. W. Nelson 6858 (W--399208); Schery 100 (Mi). Morelos: Downing 106 (Cb); W. Fosberg 95 (Z); Fröderström & Hultén 554 (S). Nayarit: Feddema 558 (Mi); M. E. Jones 23244 (Ca--400866, En--6123, Gg--172667, N, Po--162779); Edw. Palmer 2053 (W--305637). Nuevo León: Correll & Johnston 19961 (Rf); Frye & Frye 2446 (Rs--27146, Se--65908, Ua--45967, W--1791007); Herb. Mexican Biol. Exped. Univ. Mich. 927 (Fs); Mueller & Mueller 328 (Au); Edw. Palmer 1045 (Pa); Shreve & Tinkham 9747 (Fs); M. Taylor 129 (Au, Au, N, S). Oaxaca: W. H. Camp 2247 (N); C. Conzatti 3402 (Me); Conzatti & Camp 5237 (Mi); Conzatti, Webster, & Barkley 17M403 (Au--123225, N); Cuming s.n. (Cb); Galeotti 736 (W--572873), s.n. (Br); Herb. Inst. Biol. Univ. Nac. Mex. 7138, in part (Me); C. L. Smith 221, in part (W--312571). Puebla: Arsène 486 (Bz--23751), 1671 (W--464300), s.n. [4/8/1907] (Br, Br); Barkley, Paxson, & Webster 2448 (Au), 2493 (N); O. M. Clark 7328

(Ok--18721); C. C. Deam s.n. [Cholula, Jan. 1, 1899] (Mi); Galeotti 736 (Br, Br, N); Kenoyer A.257 (Mi), s.n. [Puebla, 8-9-38] (Fs); R. M. King 2627 (Gg, N); E. W. Nelson 242 (W--257526); Nicolas s.n. [Rancho Posadas, 28/1/1909] (Br, Br); H. Pittier 436 (W--570831); Purpus 3407 (Ca--138831); Rose & Rose 11398 (N); A. J. Sharp 441001 (O), 441311 (N). Querétaro: Agniel s.n. [Arsène 10252] (Bm, Cm, N, W--1001584); Rose, Painter, & Rose 9503 (W--452994). San Luis Potosí: J. Mann 18 (Cb); Parry & Palmer 719, in part (Io, Pa); J. G. Schaffner 717 (Me). Sonora: Rose, Standley, & Russell 13127 (N, W--635945); Thurber 769 (T); S. S. White 569 (Mi), 2836 (Mi, Mi), 3344 (Mi), 3939 (Mi), 4178 (Mi, N, W--2132337). Tamaulipas: Le Sueur 401 (Au, Fs); Rozynski 312 (Fs, Mi, N); H. W. Viereck 542 (W--1687288). Vera Cruz: L. I. Davis 200 (N); Halsted s.n. [Sandhills, Perote] (T, T); Kerber 255 [Herb. Osten 13019] (Br, Cp, Ug, W--1323073, W--1323074); Matuda 1263 (Mh, Mi, N, N); F. von Müller 325 (N), 591 (N), 597 (Br), 1209 (N), 1319 (M); E. W. Nelson 223 (W--257529); H. E. Seaton 150 (W--56165), 319 (W--56167), 391 (C). Zacatecas: Kuntze 23424 (N, N, N, N); F. E. Lloyd 159 (W--574126); Purpus 137 (Ca--138830); J. N. Rose 2435 (W--301346), 2769 (W--301701); Waterfall & Wallis 13806, in part (Ok). State undetermined: Arsène & al. s.n. [San Baltasar, 22 Mai 1911] (B); Galeotti 782 [Moran] (Br); Gregg s.n. [Valley of Bolron de Mapimi, April 15/47] (T); W. W. Jones s.n. [Aqua Prieta, 4/17/44] (Or--52009); Lemmon & Lemmon 229 [Lake Chapala] (Ca--74006); Liebmann 11311 [Chapulco] (W--1315090); Née 107 (Q); Sallé s.n. [Mexico] (Bm); W. Schumann 1071 [Feral] (W--1323065, W--1323075). SAN PEDROS NOLASCO ISLAND: Galeotti s.n. [S. Pedro Nolasco] (Br). GUATEMALA: Quezaltenango: A. J. Sharp 45208 (N). LOCALITY OF COLLECTION UNDETERMINED: Herb. Mus. Bot. Stockholm s.n. [17/8] (S).

VERBENA CILIATA var. LONGIDENTATA Perry, Ann. Mo. Bot. Gard. 20: 331--332. 1933.

Synonymy: Verbena ciliata var. longidentata Perry ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941.

Bibliography: Perry, Ann. Mo. Bot. Gard. 20: 312, 331--332, & 355. 1933; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Moldenke, Suppl. List Invalid Names 8. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13, 14, & 101. 1942; Moldenke, Alph. List Invalid Names 46. 1942; A. M. T. Davis, Study Boscaje Palma 42 & 61, pl. 10. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 18, 40, & 44. 1942; Moldenke, Phytologia 2: 127. 1945; Moldenke, Alph. List Cit. 1: 13, 17, 38, 42, 91, 111, 255, & 269 (1946) and 2: 393, 451, 493, 522, & 525. 1948; Moldenke, Phytologia 2: 161--162. 1948; Moldenke, Wrightia 1: 231 & 234. 1948; Moldenke, Known

Geogr. Distrib. Verbenac., [ed. 2], 23, 25, 32, & 197. 1949; Moldenke, Alph. List Cit. 3: 677, 678, 680--682, 684, 717, 754, 764, 881--883, & 939 (1949) and 4: 991, 992, 1004, 1022, 1107, 1129, 1138, 1148, 1163, 1171, 1184, 1213, 1220, & 1239. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; Moldenke, Am. Midl. Nat. 59: 357. 1958; Moldenke, Résumé 29, 31, 39, 362, & 471. 1959; Moldenke, Résumé Suppl. 3: 7, 8, & 10 (1962) and 5: 4. 1962.

Illustrations: A. M. T. Davis, Study Boscaje Palma pl. 10. 1942.

This variety differs from the typical form of the species in being of variable size and more or less open habit, its leaves bipinnatifid, and the calyx-teeth 2--2.5 mm. long.

Collectors describe it as an erect or ascending, decumbent, or even prostrate annual or perennial herb, 10 cm. tall, spreading out to mat on the ground, the mats to 1 m. in diameter; roots fibrous; bark green; leaves petiolate or sessile, incised, dissected, or deeply dissected into many lobes; flowers terminal, varying from odorless to more or less fragrant with the odor of lilac (Syringa vulgaris L.); corolla varying from pink, pinkish-lavender, pink-purple, or lavender to pale-lavender, purplish, blue-purple, lilac-purple, violet-purple, reddish-purple, or purple.

The type of the variety was collected by Jean Louis Berlandier (no. 3020) at Matamoros, Tamaulipas, Mexico, in April, 1836, and is deposited in the herbarium of the Missouri Botanical Garden at St. Louis. Perry (1933) says of the variety "Scarcely differing from the species except in the relatively very long calyx-teeth and the often somewhat less deeply cleft leaves."

Runyon makes the remarkable statement that the flowers are "paniculate", but this is certainly erroneous. He describes the plant as an "erect or ascending herb, various in form, common; fls. showy, nearly red to pure purple."

The variety is said to grow in hardpan and clay hardpan, in clay, sandy clay, dry sandy clay, clay-loam, sandy loam, silty loam on levees, sandy loam with gravel, and rich abandoned cultivated soil, inhabiting moist streambanks and roadsides, chaparral, canyons and limestone hills, open ground and fields, clay dunes, flats and vacant lots, prairies, wet meadows, roadside ditches, open pine woods and open oak-pine woods, sandy or mesquite pastures, and low ridges, from sea-level to 20 meters altitude. Runyon reports that it is "abundant bordering the Rio Grande" in Hidalgo County, Texas, and, in Cameron County, "abundant in the vicinity of Brownsville; it covers large areas of ground", "frequent on arroyo banks", and "very abundant; it grows in mass; flowers are showy and bloom two months". Jermy says that it is "abundant on prairies" in Travis County. It has been collected in anthesis and fruit from February to August, November, and December, but is said to bloom in Texas from February to November. In that state it is confined to the central and southern sections, from Llano and Bexar Counties south to Webb and Cameron, east to

Wharton and Denton, and north to Childress and Lubbock Counties. It is said to grow also in Chaves County, New Mexico. Common names recorded for it are "moradia" and "smallflowered verbenas" - the latter being a name more frequently applied to V. bipinnatifida Nutt.

Specimens have been misidentified and distributed in herbaria under the names of V. ambrosifolia Rydb., V. ambrosiaefolia Rydb., V. ambrosifolia var. eglandulosa Perry, V. bipinnatifida Nutt., V. bipinnatifida var. latilobata Perry, V. bracteata Lag., V. canadensis (L.) Britton, V. ciliata Benth., V. drummondii Bxt., V. gooddingii Briq., V. pubera Greene, V. pumila Rydb., V. teucrifolia Mart. & Gal., and V. wrightii A. Gray.

On the other hand, the McCart & Cantu 71 distributed as V. ciliata var. longidentata is actually var. pubera (Greene) Perry.

Willegas refers to the plant as "frequent" and "abundant" in San Patricio County, Texas, where Tharp & Brown found it inhabiting the Beaumont clay. Johnston found it among plowed brush in blackland clay, in somewhat brushed remnants of prairies on black clay soil along railroad rights-of-way, and in roadside clearings in woods on brownish-gray clayey sand in uplands near a creek. Traverse encountered it on dry hillsides, wind-planed open scrub, in hard-packed gray-brown silt with much cracking of the soil surface, in Zizyphus-Opuntia lindheimeri complex, while Gray found it in open full sun with Phlox, coneflowers, and prickly-poppies. Waterfall says that it grows at "base of cliffs in yellow pine forests", and Davis & Johnston found it in clearings in dense brush on Fien tight clay along an arroyo. Johnston refers to his plants as "V. bipinnatifida very close to V. ciliata." The leaves on White 3344 and Waterfall 12971 do not look typical.

The San Luis Potosí, Mexico, record given by me in my Known Geogr. Distrib. Verbenac., [ed. 1], 18 (1942) and [ed. 2], 32 (1949) and Résumé 39 (1959) was based on C. L. Lundell 5590, which, however, proves to be V. gooddingii Briq. On the other hand, the Lundell & Lundell 10363 from Travis County, Texas, cited in Lundell, Fl. Texas 3 (1): 40 (1942) as V. bipinnatifida, is actually V. ciliata var. longidentata. Hanson 322 is a mixture with V. pumila Rydb., Heller 1385 is a mixture with V. quadrangulata Heller, and Rose & Russell 24387 is a mixture with Phyla strigulosa (Mart. & Gal.) Moldenke. M. S. Young 113 may be V. bipinnatifida, but its leaf-characters are those of V. ciliata var. longidentata.

The Davis reference given in the bibliography above is actually a thesis entitled "A study of Boscaje de la Palma in Cameron County, Texas, and of Sabal texana", by Anna May Tarrence Davis, deposited in public libraries in August, 1942.

Perry (1933) cites the following 11 additional specimens not as yet seen by me: TEXAS: Bexar Co.: Eggert s.n. [near San Anton-

io, 4 April 1901] (E). Hamilton Co.: Trelease s.n. [Vista, May 1892] (E). Kleberg Co.: High 59 (E). Nueces Co.: Orcutt 5792 (E). Webb Co.: Orcutt 5657 (E). NEW MEXICO: Chaves Co.: Benke 5046 (E, F, G). MEXICO: Tamaulipas: Berlandier 1520 (G), 3020 (E--type, G-isotype). She cites Rose & Rose 11398 (G) as V. ciliata Benth.

In all, 168 herbarium specimens, including type material of all the names involved, have been examined by me.

Citations: TEXAS: Bee Co.: Lundell & Lundell 10052 (Ld, W--1888887), 10062 (N). Bexar Co.: Barkley & Parsons 8 (Au); Herb. Wall 5, in part (S); S. McClatchie 175 (W--2131734), 176 (W--2131735); Metz 2505 (Go, S). Cameron Co.: V. Bailey 221 (W--443411); Brenckle 47-349 (N); H. B. Cannon s.n. [La Feria, Feb. 25, 1926] (Mi); Cory 51350 (Sm); L. I. Davis s.n. [Palm Grove, Summer '41] (Au); Davis & Johnston 53253.20 (Au--122027); Hanson 322, in part (Mi); M. C. Johnston 253-10 (Au--122028), 542175 (Au--122022, St); C. L. Lundell 10656 (N, Rf, W--1926928); Lundell & Lundell 8683 (Ld, Mi, N), 9996 (Ld, N, W--1888866), 10024 (Ld, N), 10027 (Ld, N, W--1888879); Muenschner & Muenschner 14457 (N); Nealley 116 (W--62141); Rose & Russell 24387, in part (W--1369656); R. Runyon 630 (W--1224223), 2361 (N, N, N), 2498 [216a] (N, N), 2498 [216b] (N, N), 2498 [216c] (N, N), 2694 (N, N, N); Sixth Grade Brownsville s.n. [Nov. 1934] (Au, Au); Tharp, Gimbrede, & Johnston 52-512 (Au--122571); Traverse 1117 (Au--179211, W--2339927); Wolcott & Barkley 16T377 (Au, N). Childress Co.: Biology Class Univ. Texas s.n. [Childress, Apr. 1930] (Au); Wild Flower Contest s.n. [April 1936] (Au). Denton Co.: McCart 998 (Mi). Duval Co.: McCart 7187 (Ok, Ok). Fayette Co.: Warner s.n. [Lagrange, May] (Hu). Garza Co.: Wooton s.n. [Post, May 22, 1925] (W--1244641). Hidalgo Co.: C. C. Albers 46401 (N); L. H. Bailey 7434 (Ba); Clover 567 (Mi, Mi, N); Herb. Univ. Texas s.n. [Edinburg, Spring] (Au); Lundell & Lundell 9801 (Ld, N), 9805 (Ld, N); R. Runyon 2562 (N, N, N). Jim Wells Co.: M. C. Johnston 542122 (Au--122023). Kleberg Co.: M. C. Johnston 53253.24 (Au--122026), 53253.25 (Au--122025), 53253.26 (Au--121654). Live Oak Co.: C. E. Gray 18 (Mi). Llano Co.: Lundell & Lundell 14564 (Sm); Tharp s.n. [Enchanted Rock, 6.12.30] (Au). Lubbock Co.: Demaree 7685 (Du--205651, W--1468996). Medina Co.: J. B. Davy 21 (Ca--25133). Nueces Co.: V. Bailey 258 (W--443446); A. A. Heller 1385, in part (C, Ca--25132, Es, Io--38748, Mi, N, N, Pl--72008, S, Se--14958, Ur, W--213881); M. C. Johnston 542303 (Au--122013); R. Runyon 4279 (N, Sm), 4280 (N), 4281 (Mg, N, Ot, Sm); Tharp 5602 (W--1468814), s.n. [Corpus Christi, 11-9-32] (Au, Au, Au, St--9244); Tharp & Brown 48-169 (Au--121593, N, St, St). San Patricio Co.: L. H. Bailey 7402 (Ba);

Cory 51256 (Sm); Lundell & Lundell 10087 (Ld, N); E. D. Schulz 845 (W--1243240); Tharp & Brown 48-207 (Au--122573, N), 48-222 (Au--121592, Au--121657, N); Williges 2 (Au--175536), 309 (Au--179792). Starr Co.: Lundell & Lundell 9786 (Ld, N, W--1888826). Tarrant Co.: Ruth 110, in part (W--501770). Travis Co.: Armer s.n. [Austin, 4-2-29] (Mi); Lundell & Lundell 10363 (Ld, N); Tharp & Barkley 51-863 (Au--121663); M. S. Young 113, in part (Au--121602, Ca--882578). Webb Co.: Blair & al. 48-492 (Au--122570); Cantu, Villa, & McCart 75 (Ok); Hamby 514 (Ar--206562); Lundell & Lundell 10105 (Ld, N); McCart 7255 (Ok); Reyna, Mendoza, & McCart 6 (Ok). Wharton Co.: J. K. Small s.n. [near Wharton, April 12, 1925] (W--1739112); Small & Wherry 11834 (N). Willacy Co.: Tharp & Ecology Class s.n. [Lyford, March 1, 1930] (Au), Zapata Co.: Lundell & Lundell 10108 (Ld, N). County undetermined: Berlandier 429 (T). NEW MEXICO: Otero Co.: Waterfall 12971 (Mi). MEXICO: Coahuila: Wynd & Mueller 450 (Fs, N), 572 (N). Durango: Forrer s.n. [Sierra Madre, Sept. & Oct. 1881] (Ca--192062); Waterfall 15503 (St); Waterfall & Wallis 13737 (St). Puebla: Rose & Rose 11398 (W--454181). San Luis Potosí: C. L. Lundell 5590 (Mi, N, N, S, Tu--98762). Sonora: S. S. White 3344 (Mi). Tamaulipas: Berlandier 3020 (C--isotype); Tracy s.n. [Matamoros, 4-10-1905] (Tr).

VERBENA CILIATA var. *PUBERA* (Greene) Perry, Ann. Mo. Bot. Gard. 20: 332. 1933.

Synonymy: *Verbena pubera* Greene, Pittonia 5: 136. 1903.

Glandularia pubera (Greene) Small ex Moldenke, Suppl. List Invalid Names 2, in syn. 1941. *Verbena pubera* (Greene) Perry ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. *Verbena ciliata* var. *pubera* Perry ex G. L. Fisher, Am. Bot. Exchange List. 1946. *Verbena ciliata pubera* Perry ex Moldenke, Résumé 362, in syn. 1959. *Verbena ciliata pubera* (Greene) Perry, in herb.

Bibliography: Greene, Pittonia 5: 136. 1903; Prain, Ind. Kew. Suppl. 3: 187. 1908; Perry, Ann. Mo. Bot. Gard. 20: 312, 332, & 355. 1933; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Moldenke, Prelim. Alph. List Invalid Names 48. 1940; Moldenke, Suppl. List Invalid Names 2 & 10. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 18 & 44. 1942; Moldenke, Alph. List Invalid Names 25 & 49. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13, 14, & 101. 1942; Moldenke, Castanea 10: 39 & 40. 1945; Moldenke, Phytologia 2: 127--128. 1945; G. L. Fisher, Am. Bot. Exchange List. 1946; Moldenke, Alph. List Cit. 1: 114, 127, 140, 157, 175, 246, 255, 257, 295, & 297. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; Moldenke, Phytologia 2: 329 (1947) and 2: 478. 1948; Moldenke, Wrightia 1: 234. 1948; Moldenke, Castanea 13: 112. 1948; Moldenke, Alph. List Cit. 2: 439, 455, 467, 470, 472, 474, 475, 489, 491, 496, 505, 521--523, 571, 588, 595--597, & 639 (1948), 3: 667, 769, 770, 797, 803, 806, 887,

933, 939, 944, & 977 (1949), and 4: 1004, 1097, 1125, 1126, 1138, 1167, 1175, 1198, 1220, 1223, 1239, 1241, 1246, & 1252. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 20, 23, 25--27, & 197. 1949; Moldenke, Phytologia 3: 304. 1950; Moldenke, Résumé 25, 29, 31, 33, 296, 362, 373, & 471. 1959; Moldenke, Résumé Suppl. 5: 4. 1962.

This variety differs from the typical form of the species in its more or less prostrate compact habit and the ultimate segments of the leaves being linear-oblong, their margins strongly revolute.

Collectors describe the plant as upright or erect from a somewhat decumbent or procumbent base. Perry (1933) says "This variety is a low plant with several stems from a common base, short internodes, and a tendency to branch freely. The leaves are more finely dissected than in the species and the margins are more revolute."

The type of the variety was collected by Samuel Mills Tracy and Franklin Sumner Earle (no. 162, in part) in the Davis Mountains, Jeff Davis County, Texas, on April 23, 1902. In the United States National Herbarium someone has placed a note on the specimen of this collection reading "not type collection", but on what basis is not clear to me.

Collectors have found the plant in red soil, on shady cliffs, mesas, and hills, open grassy plains, level grasslands, on sandy-clay flats, along roadsides, in desert regions and orchards, and along dry arroyos on sand bars, from 4000 to 7100 feet altitude, flowering from February to August and fruiting from March to August. In Texas it is said to be found on plains and low mountains, blooming from February to August, in the Trans-Pecos and Plains Country of the western part of the state, from El Paso to Pecos Counties, north to Garza and Lubbock Counties. The only recorded common name is "bracted verbena", and that was probably applied in error.

Herbarium specimens of this plant have been misidentified and distributed under the names V. ambrosifolia Rydb., V. ambrosifolia Rydb., V. aubletia Jacq., V. bipinnatifida Nutt., V. bracteosa Michx., V. canadensis (L.) Britton, V. ciliata Benth., V. ciliata var. longidentata Perry, and V. wrightii A. Gray.

On the other hand, the Ripley & Barneby 4188, distributed as V. ciliata var. pubera, is actually V. racemosa Eggert; Sperry T.126 is V. ambrosifolia Rydb.; Wooton 2835 and s.n. [Ojo Caliente, July 18, 1904] are V. ambrosifolia f. eglandulosa Perry; R. E. Beckett 10023 is V. ciliata Benth.; Demaree 7685 is V. ciliata var. longidentata Perry; and S. E. Wolff 1666 is V. wrightii A. Gray.

Demaree reports that the variety is "common here [Lubbock County, Texas] but considered rare". Nelson & Nelson found it "sprawling on sandy plains" in New Mexico, while Maguire, Rich-

ards, & Moeller say that it is "common in grass type with Hilaria mutica, Prosopis, and Yucca elata" in the same state. In Arizona Hanson says that it is "infrequent in cindery soil" and "rare in washes", while Wiegand, Richards, & Moeller describe it as "frequent in grass plains" and in "browse type with Rhus trilobata dominant." Peebles & Fulton 11790 is very typical.

As to C. B. Wolf 2490, my friend, T. H. Kearney, says "V. ambrosifolia Rydb. in the long calyx teeth but otherwise resembles V. ciliata Benth." As to Peebles & Harrison 4112 he says "gland much smaller than anther cells; nutlets very like those of [Loomis & Peebles] 5353, minutely scabrous on the commissure." A typewritten label on Gunning & Goodding 2297 in the University of Arizona herbarium says "Near Fort Stanton, Utah" and Leslie N. Goodding's surname is misspelled "Gooding". The Collector undesignated s.n. [Partridge Creek, April 26] collection is a mixture with V. gooddingii Briq.

Perry (1933) cites the following 11 additional specimens not as yet seen by me: TEXAS: El Paso Co.: Orcutt 6172 (E). Jeff Davis Co.: Tracy & Earle 162, in part (E--isotype). NEW MEXICO: Grant Co.: Greene s.n. [near Silver City, May 1880] (E). Hidalgo Co.: Evans s.n. [Lordsburg, 3 July 1891] (E); M. E. Jones 26227 (E). Luna Co.: M. E. Jones 26232 (E). ARIZONA: Coconino Co.: H. C. Hanson A.1146 (E, F). Mohave Co.: M. E. Jones 25480 (E). Navajo Co.: Zuck s.n. [Taylor, Aug. 1, 1897] (E). Yavapai Co.: W. W. Jones 180 (G).

In all, 109 herbarium specimens, including type material of all the names involved, and 2 mounted photographs have been examined by me.

Citations: COLORADO: Archuleta Co.: Bethel s.n. [Pagosa Junction, 8-26-1921] (Fc). Denver Co.: Bethel s.n. [Denver, June 1893] (Fc). Huerfano Co.: R. B. Livingston 59 (H--58348). Las Animas Co.: Collector undesignated 4184 (Fc). Pueblo Co.: Harrington & Smith 186 (Fc); Rydberg & Vreeland 5676 (Fc). TEXAS: Brewster Co.: Cutler 21140 (Tr). Culberson Co.: Hinckley 1440 (N). Garza Co.: F. W. Pennell 10532 (N). Jeff Davis Co.: Earle & Tracy 337 (N); Small & Wherry 12072 (N); Tracy & Earle 162, in part (Cm--isotype, Es--isotype, N--isotype, N--photo of isotype, Tr--16180--isotype, Vt--isotype, W--441832--isotype, Z--photo of isotype). LaSalle Co.: A. Cantu 71 (Ok). Lubbock Co.: Demaree 7460 (Du--205838, W--1699021), 7460a (Sd--24074). Pecos Co.: Hinckley 4675 (W--2003758); Parks & Cory 18349 (Tr), 18350 (Tr), 18353 (Tr), 18354 (Tr). Webb Co.: McCart 7194 (Ok, Ok, Ok). NEW MEXICO: Bernalillo Co.: M. E. Jones s.n. [Albuquerque, Sept. 5, 1884] (Gg--130527); E. J. Palmer 31153 (Mg--62). Catron Co.: Wootton s.n. [near Horse Camp, June 18, 1892] (W--736931). Dona

Ana Co.: G. L. Fisher 38148 (Ew). Eddy Co.: Cory s.n. [Carlsbad, 4-24-1926] (Tr). Grant Co.: Eastwood 8465a (Gg--31294), 8527 (Gg--31295); E. L. Greene s.n. [Silver City, May 18, 1880] (Mi), s.n. [near Silver City, May 1880] (Po--71158); Maguire, Richards, & Moeller 11503 (Ua--47406); S. E. Wolff 1704 (W--1623959). Hidalgo Co.: M. E. Jones 26227 (Po--178354). Lincoln Co.: Gunning & Goodding 2297 (Tu--104393); J. Skehan 5 (Ca--25142, Ca--882634, Cm, N, N, Po--63900). Luna Co.: M. E. Jones 3801 (Br, Ca--373380, Gg-154422, N, Ob--50877, Po--71136, Ua--11389, W--220167), 26232 (La, Po--178356), s.n. [Deming, April 29, 1884] (Po--65181). Quay Co.: G. L. Fisher 101 (W--619297). Sierra Co.: Vreeland 804 (N, Pl--22602). Socorro Co.: Wooton 3849 (W--560636). Valencia Co.: Nelson & Nelson 2187 (Ua--23756). County undetermined: D. R. Goddard 728 [Mogollon Mts.] (Ca--505469); L. Johnson s.n. [9-7-1921] (Fc); Wooton s.n. [Mesa near N. H. Ranch, July 13, 1906] (W--736869). ARIZONA: Apache Co.: Peebles & Smith 13972 (To). Cochise Co.: Cottam 10183 (Fs); Gould & Pultz 3154 (Ca--705185, W--1893187); Loomis & Peebles 5353 (To); Toumey s.n. [Chiricahua Mts., Apr. 5, 1897] (W--619183); Wiegand, Maguire, Richards, & Moeller 11150 (Ua--47407); C. B. Wolf 2490 (Gg--174176). Coconino Co.: Bacigalupi 514 (Ca--882631, Du--286365); Cantelow s.n. [Wupatki Natl. Mon., May 4, 1942] (Gg--316094); C. Dudley 59 (Gg--192473); H. C. Hanson 146 (N), A. 146 (Au, Or--20488, Ur), A. 146a (Bl--42303, Up--80695); Hawver s.n. [July 23, 1932] (Gg--196002); J. T. Howell 26611 (Gg--359562); M. E. Jones s.n. [Cameron's June 16, 1929] (Po--160339); Kearney & Peebles 13983 (To); Peebles & Fulton 11790 (To); Mrs. F. M. Stone 364 (N); L. F. Ward s.n. [near Black Tank, June 1, 1901] (W--410321). Gila Co.: Wiegand, Maguire, Richards, & Moeller 11324 (Ua--47405). Graham Co.: Shreve 5280 (Fs). Mohave Co.: M. E. Jones 25480 (Du--232024, Gg--237847, Mn--22536, Po--179027). Navajo Co.: Hoyt s.n. [Ft. Apache, April 1893] (C); Zuck s.n. [Taylor, Aug. 1, 1897] (N). Santa Cruz Co.: Peebles & Fulton 11489 (W--1634346). Yavapai Co.: Newlon 774 (Ca); Peebles & Harrison 4112 (To); Wiegand & Upton 4187 (N). County undetermined: MacDougal s.n. [1891] (N); L. F. Ward s.n. [near Black Tank, June 1, 1901] (N). CALIFORNIA: Los Angeles Co.: Leal s.n. [Los Angeles, 1882] (H--106469). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated s.n. [Partridge Creek, April 26] (W--71929); Purpus 8036 [desert region, southwestern California to southern Utah] (Ca--104880).

VERBENA CLAVATA Ruiz & Pav., Fl. Peruv. & Chil. 1: 21--22, pl. 33b, fig. 1--6. 1798.

Synonymy: Verbena tetrandra, foliis senis quinisque biformibus; floribus capitato-umbellatis, antheris superioribus dorso clavatis Ruiz & Pav. ex Poir. in Lam., Encycl. Méth. Bot. 8: 550, in syn. 1808. Verbena calcicola Walp., Nov. Act. Acad. Caes. Leopold.-Carol. Nat. Cur. 19, Suppl. 1: 378. 1843. Shuttleworthia ruiziana Walp., Repert. Syst. Bot. 4: 12. 1845. Verbena fissa Hayek in Engl., Bot. Jahrb. 42: 165. 1908.

Bibliography: Ruiz & Pav., Fl. Peruv. & Chil. 1: 21--22, pl. 33b, fig. 1--6. 1798; Poir. in Lam., Encycl. Méth. Bot. 8: 550. 1808; J. Sm. in Rees, Cycl. 36: no. 8. 1817; Spreng. in L., Syst. Veg., ed. 16, 2: 749. 1825; Walp., Nov. Act. Acad. Caes. Leopold.-Carol. Nat. Cur. 19, Suppl. 1: 378. 1843; Walp., Repert. Syst. Bot. 4: 12 & 15--16. 1845; Schau. in A. DC., Prodr. 11: 550--551. 1847; Jacks., Ind. Kew. 2: 895 & 1178. 1895; Briq., Ann. Conserv. & Jard. Bot. Genève. 10: 104. 1907; Hayek in Engl., Bot. Jahrb. 42: 165. 1908; Prain, Ind. Kew. Suppl. 4: 245. 1913; Stapf, Ind. Lond. 6: 429. 1931; R. Espinosa, Ökol. Stud. Kordillerenpfl. 36 & 38. 1932; Moldenke, Suppl. List Invalid Names 7 & 8. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 101. 1942; Moldenke, Alph. List Invalid Names 40, 46, & 47. 1942; Raimondi, Bol. Mus. Hist. Nat. Jav. Prado 7: 244. 1943; Moldenke, Bot. Gaz. 106: 162. 1945; Moldenke, Holmbergia 4: 151. 1945; Moldenke, Phytologia 2: 335 & 338. 1947; Moldenke, Castanea 13: 116. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 44. 1948; Moldenke, Alph. List Cit. 2: 593 (1948), 3: 687, 728, 732, 766, 881, & 893 (1949), and 4: 1078, 1112, 1113, 1134, & 1215. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73, 101, & 197. 1949; Moldenke, Phytologia 3: 290. 1950; Biol. Abstr. 26: 3844. 1952; Moldenke, Résumé 84, 121, 344, 360, 364, & 471. 1959; Moldenke, Résumé Suppl. 3: 41. 1962.

Illustrations: Ruiz & Pav., Fl. Peruv. & Chil. 1: pl. 33b, fig. 1--6. 1798.

Perennial herb or small subshrub, sometimes a dwarfish shrub or bush, 15 cm. to 1 m. tall, usually prostrate or decumbent, bushy-branched, strigose-hirsute and incanous or canescent throughout, woody at the base; stems ascending or often decumbent, much branched; leaves decussate-opposite, 6--15 mm. long, spreading, sessile, resembling those of rosemary (Rosmarinus officinalis L.), gray-green, tripartite almost to the base, the lobes lanceolate, divaricate, linear, obtuse, and entire or cuneate and 2- or 3-fid, revolute along the margins, often forming a sub-verticil around the stem, powerfully fragrant; spikes sessile, capitate, few- or many-flowered, involucrate by the uppermost leaves; bractlets lanceolate or linear-oblong, subequaling or shorter than the calyx, canescent-hirsute; flowers powerfully fragrant; calyx prismatic-pentagonous, long-tubular, about 6 mm. long, red, canescent-hirsute, its rim acutely 5-dentate or unequally 5-fid, the lobes plicate-subulate; corolla hypocrateriform, varying from purple or purplish to violet, parma-violet, lilac, clear-lilac, pale-pink, pale bluish-pink,

or even blue, its tube usually purple, 2--3 times as long as the calyx, strigose-pubescent above, pubescent in the throat, the limb usually light-purple, medium in size, the lobes linear-oblong, 2 narrow and entire, the rest emarginate; anther-appendages exerted, clavate, stipitate, curvate-divergent; fruiting-calyx constricted and contorted above the fruit.

Cotypes of this distinctive species were collected by Hipólito Ruiz at or near Arica and Huánuco, Peru, and are deposited in the herbarium of the Botanisches Museum at Berlin, now probably destroyed. Shuttleworthia ruiziana is based on the Arica collection, and is merely a new name for Verbena clavata. The type of V. calicicola was collected by Franz Julius Ferdinand Meyen at Pampa Grande, Arequipa, Peru, and was also deposited in the Berlin herbarium. It is most lamentable that these historic specimens should have been destroyed during World War II. Verbena fissa was based on August Weberbauer's no. 2768, collected in open formations of herbs, cacti, bromeliads, and shrubs, at lower Ocros, in the province of Cajatambo, Ancash, Peru -- the label on Macbride's photograph of this collection is incorrectly inscribed "768" -- and on no. 389, collected in sandy soil on the hills east of Mollendo, Arequipa, Peru, at 500 meters altitude, but descending to 200 meters and said to be very abundant.

The species was placed by Schauer in his Section Glandularia, while Walpers placed it in his Section Verbenaca, Subsection Inermes, and Group Thymoides. Schauer notes that "Foliis ab affinis distinctissima".

The species has been collected in dry, stony, sandy, or clayey soil, in partial shade or full-sun exposure, among rocks, on desert hills or dry hillsides, in dry sandy gullies, in arenales or the lower part of loma zone, on middle and lower green slopes, and in almost desert or true desert country, at altitudes of 15 to 3300 meters, flowering from January to March and August to November. Hitchcock states that it blooms "after the October rains". Common names recorded for it are "verveine à massue" and "whorled vervain".

Specimens of this plant have been misidentified and distributed in herbaria as Hierobotana inflata (H.B.K.) Briq., which it resembles superficially. R. S. Williams 2969 was misidentified and distributed in herbaria as Frankenia lignosa Rusby, of which the type is R. S. Williams 2531 (cfr. Bull. N. Y. Bot. Gard. 8: 106. 1912). On the other hand, the Weberbauer 7385, distributed as V. clavata, is actually var. casmensis Moldenke.

Raimondi (1943) cites his no. 686 from Ancash, Peru, and no. 13001, also from somewhere in Peru. He says "Flores blancas o ligeramente moradas, muy aromáticas. Planta rastrera". Johnston says "flowers white or pink", and Ferreyra has indicated the flowers as "white-violet" or "white-rose", probably meaning that the corolla varies from violet or rose to white. The white form is described below.

In all, 30 herbarium specimens and 6 photographs, including phototypes of all the names involved, have been examined by me.

Citations: PERU: Ancash: Proaño 66 (Ok); Sandeman 4611 (K, W--2210962); Weberbauer 2768 [Macbride photos 17416] (Kr--photo, N--photo). Arequipa: Cook & Gilbert 41 (W--603336); Eyerdam 25159 (Ca--658266); R. Ferreyra 5554 (N), 6345 (W--1998691), 6378 (W--1998696), 11575 (Ok), 11577 (Ok), 12079 (Ok); A. S. Hitchcock 22419 (W--1196666); I. M. Johnston 3560 (S); Meyen s.n. [Pampa Grande; Macbride photos 17409] (Kr--photo, N--photo); Rauh & Hirsch P.564 (Z); Sandeman 4018 (K); Scolnik 1030 (Er, N); Vargas 2023 (W--1830538); J. West 8202 (Ca--565207); R. S. Williams 2914 (N), 2969 (N). Huánuco: Ruiz s.n. [Macbride photos 17408] (Kr--photo of cotype, N--photo of cotype). Lima: S. G. E. Saunders 211 (Bm). Moquegua: Weberbauer 7464 (S, W--1474548). Tacna: R. D. Metcalf 30374 (W--1834984). Department undetermined: Cuming 954 (Br, N); Née 95 (N, Q). CHILE: Antofagasta: Barros Valenzuela 8008 (N).

VERBENA CLAVATA f. ALBIFLORA Moldenke, Phytologia 3: 278--279. 1950.

Bibliography: Moldenke, Phytologia 3: 278--279 & 286. 1950; Biol. Abstr. 26: 3844. 1952; Moldenke, Résumé 84 & 471. 1959.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by my good friend, Ramón Ferreyra (no. 2507) in a sandy habitat between 300 and 350 meters altitude between Naxca and Chala, Arequipa, Peru, on November 7, 1947, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has also been collected in deserts, at an altitude of 200 meters, flowering in March.

In all, 4 herbarium specimens, including the type, have been examined by me.

Citations: PERU: Arequipa: Alva A. 158 (W--2270249), 181 (W--2270250); R. Ferreyra 2507 (N--type). Ica: Rauh & Hirsch P.475 (Z).

VERBENA CLAVATA var. CASMENSIS Moldenke, Phytologia 4: 58. 1952.

Bibliography: Moldenke, Phytologia 4: 58 & 70. 1952; Moldenke, Résumé 84 & 471. 1959.

This variety differs from the typical form of the species in having its leaves mostly nigrescent in drying, about 3 mm. wide, with short irregularly spreading and twisted hairs on both surfaces, and only very slightly revolute along the margins.

The type of the variety was collected by Ramón Ferreyra (no. 8031) on a sandy hillside at Loma de Casma, in the province of Santa, Ancash, Peru, at an altitude of between 250 and 300 meters, on September 9, 1950, and is deposited in the United States Herbarium at Washington.

Collectors describe the plant as a low, sprawling, perennial herb, often prostrate, or a suffrutescent bush 30—60 cm. tall, spreading to form a low dome, the flowers fragrant, with a very strong sweet odor, and the corolla lilac, rose-color, pale pinkish lilac, or lavender, or "white to very pale-lavender with yellowish centers". Ferreyra says "las raices son casi superficiales, formando como almohadillados".

It has been found on sandy mountain slopes, in dry loose sandy soil, and on arid hills above the ocean in the fog belt vegetation, at altitudes of 40 to 2900 meters, flowering in March, September, and November. Worth & Morrison report that it is "general on slopes and sand flats" and Mexia terms it "common". A vernacular name recorded for it is "tacpa". Its leaves resemble those of V. trifida H.B.K. in width and color, but the spreading, rather than closely appressed, pubescence distinguishes our plant at once from this species and from the typical form of V. clavata Ruiz & Pav., with which it has sometimes been confused in herbaria.

In all, 9 herbarium specimens, including the type, have been examined by me.

Citations: PERU: Ancash: R. Ferreyra 8031 (W--2028584--type), 8035 (N, W--2028586), 8041 (W--2049544); Stork, Horton, & Vargas 9184 (Ca--639439, Ca--647043). Arequipa: Mexia 4170 (Ca--561809); Worth & Morrison 15719 (Ca--656668). Tacna: Weberbauer 7385 (W--1474546).

xVERBENA CLEMENSORUM Moldenke, Phytologia 2: 421--422. 1948.

Bibliography: Moldenke, Phytologia 2: 421--422. 1948; Moldenke, Castanea 13: 113. 1948; Moldenke, Alph. List Cit. 4: 1205. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 27 & 197. 1949; Howell, Wasmann Journ. Biol. 10: 377. 1952; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Am. Midl. Nat. 59: 344. 1958; Moldenke, Résumé 33, 371, 373, & 471. 1959.

Coarse herb, apparently quite tall and much-branched; stems and branches rather acutely tetragonal, striate-canaliculate, glabrous; nodes annulate; principal internodes mostly elongate, 3.5--6.5 cm. long; leaves chartaceous, stiff, uniformly green on both surfaces, ovate in outline, deeply and irregularly incised, the larger more or less 3-lobed, 2.5--8 cm. long, 1--3 cm. wide, the smaller ones very scabrous above, the larger ones glabrous or scabrous-margined, all more or less scabrous beneath (especially the smaller ones just beneath the inflorescence), the slender midrib and secondaries usually impressed above and quite prominent beneath, the margins usually more or less subrevolute; petioles absent or so slightly alate as to merge completely with the leaf-blade; inflorescence spicate, compound, the peduncles and rachis acutely tetragonal, minutely and rather sparsely puberulent-pulverulent, apparently somewhat glandular, the floriferous portion of the spikes elongate (often to 20 cm. long), rather densely flowered; bractlets ovate, upwardly curvate, about 2 mm. long, subacuminate at the apex, keeled on the back, minutely

puberulent-pulverulent on the back, ciliolate-margined, about equaling or slightly shorter than the calyx; calyx 2--2.5 mm. long, glandular-puberulent; corolla-tube about 3 mm. long, subglabrate or very minutely pulverulent outside, the limb about 2 mm. wide; cocci about 1.6 mm. long.

The type of this natural hybrid was collected by Mary Knapp Clemens at Jackson, Amador County, California, on September 13, 1920, and is deposited in the herbarium of the California Academy of Sciences in San Francisco. It is named in honor of Mrs. Clemens and her husband, Joseph Clemens, who have done such noteworthy collecting of members of this group in Michigan, Oklahoma, Texas, Utah, California, the Philippines, Australia, and French Indochina. The plant seems to be a hybrid, but its parentage is not certain. Verbena officinalis L. is probably one parent, and the other may well be V. robusta Greene, as both these species are known to occur in Amador County. They both also occur in San Diego County, and the hybrid may therefore be expected there, too. Otherwise there seems little opportunity for the two species to come together in the wild state. V. officinalis is an Old World species, introduced and naturalized in some parts of the United States, while V. robusta is a species found only in California, the Channel Islands, and the Mexican state of Baja California. The hybrid is known thus far only from the type collection.

In all, 2 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: CALIFORNIA: Amador Co.: M. K. Clemens s.n. [Jackson, Sept. 13, 1920] (F--photo of type, Gg--31394--type, N--isotype, N--photo of type, Si--photo of type, Z--photo of type).

VERBENA CLOVERAE Moldenke, Am. Midl. Nat. 24: 751--752 [as "cloveri"]. 1940; Known Geogr. Distrib. Verbenac., [ed. 2], 23 & 197. 1949.

Synonymy: Verbena cloveri var. lilacina Moldenke, Phytologia 2: 23--24. 1941. Verbena neomexicana var. grandiflora Moldenke, Suppl. List Invalid Names 9, in syn. (1941); Alph. List Cit. 2: 596, hyponym. 1948. Verbena cloverii Moldenke, Résumé Suppl. 3: 37, in syn. 1962. Verbena cloveri var. cloveri [McCart], in herb.

Bibliography: Moldenke, Am. Midl. Nat. 24: 751--752. 1940; Moldenke, Phytologia 2: 23--24. 1941; Moldenke, Suppl. List Invalid Names 9. 1941; Moldenke, Alph. List Invalid Names 49. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 16, 17, & 29. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13 & 101. 1942; Moldenke, Phytologia 2: 128 (1945), 2: 162. 1946; Moldenke, Alph. List Cit. 1: 111, 125, & 282. 1946; Moldenke, Phytologia 2: 328. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; Moldenke, Alph. List Cit. 2: 596. 1948; Moldenke, Wrightia 1: 227. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 54. 1948; Moldenke, Alph. List Cit. 2: 477 (1948), 3: 678--683, 741, 784, 822, 843, 882, & 936 (1949), and 4: 990, 991, 1138, 1170, 1207, & 1242. 1949; Molden-

ke, *Phytologia* 3: 132. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 23 & 197. 1949; Moldenke, *Am. Wild Fls.* 293 & 450. 1949; Moldenke, *Résumé* 29, 362, 370, 418, & 471. 1959; Lewis & Oliver, *Am. Journ. Bot.* 48: 639--641. 1961; Moldenke, *Résumé Suppl.* 3: 7, 10, & 37. 1962.

Illustrations: Lewis & Oliver, *Am. Journ. Bot.* 48: 640. 1961.

Erect annual or perennial herb, woody at the base, branching from near the base; roots fibrous; bark green; branches rather sharply 4- or 5-angled, densely short-villous, the hairs standing at right angles to the branches, not gland-tipped; cauline leaves petiolate; petioles 0.5--1.5 cm. long, broadly winged to the base; leaf-blades rather firm, resembling those of V. plicata Greene, mostly ovate in outline, those on the main branches 1.5--3 cm. long, 1--2.5 cm. wide, coarsely and irregularly incised-dentate or shallowly 3-lobed toward the base, shortly and obscurely puberulent above, more densely short-pubescent (especially along the larger venation) beneath; the entire venation impressed above and very prominent and whitish beneath as in V. plicata; leaves in the inflorescence small, sessile or subsessile to shortly winged-petiolate, sharply and coarsely incised-dentate or lobed, firm and rather stiff, rapidly decreasing in size upwards; spikes 8--25 cm. long; rachis pubescence often short and densely glandular; bractlets lanceolate, stiff, the lowermost to 7 mm. long, the uppermost 2.5--3 mm. long, shorter than the calyx during anthesis, often short-pubescent and densely glandular; calyx 4--4.5 mm. long, prominently 4-ribbed, purplish as in Stylodon carneus (Medic.) Moldenke before and during anthesis, often short-pubescent and densely glandular, the ribs often hirsute like the branches; corolla hypocrateriform, varying from blue, bluish-lavender, or bluish-purple to lavender, lilac, purplish, pale-purple, or purple, or actually pink when fresh (with a faint lavender tinge) and becoming pale-lavender only after drying, or even "white" [Tharp & York 27], the tube far surpassing the calyx, 8 or more mm. long, the limb 7--8 mm. wide; chromosome number: $n = 7$.

The type of this handsome species was collected by Elzada Urseba Clover (no. 1618) -- in whose honor it is named -- four miles north of Rio Grande City, Starr County, Texas, on January 11, 1934, and is deposited in the Britton Herbarium at the New York Botanical Garden. The specific epithet was originally published as "cloveri", but under the present International Rules of Botanic Nomenclature the names of taxa named after women should end in "-ae". The type of var. lilacina was collected by Cyrus Longworth Lundell and Amelia A. Lundell (no. 10142) off United States Highway 81 near Millett, LaSalle County, Texas, on April 9, 1941, and is deposited in the same herbarium. It is said to differ from the typical form of the species in the pubescence on the rachis, bractlets, and calyx being much shorter and densely glandular and in the corolla being lavender instead of purple. Nos. 10140 and 10141 of the same collectors apparently

represent the same entity. Mr. L. I. Davis, however -- to whom we are indebted for so much accurate field knowledge of members of this genus -- states that "our friend Thelma Walker doubts that a lavender flowered V. cloveri could be considered a valid variety since she says all of the flowers are slightly on the lavender side of blue and she thinks every shade of intergrade is found. She has a much better chance to study that species....as her farm is literally covered with the plants in the spring." Both Mr. Davis and Miss Walker have called my attention to the fact that the flowers are actually pink when fresh (with a faint lavender tinge) and become pale-lavender only after drying. Tharp & York 27 is described by the collectors as having white flowers; if so, it may deserve a special form designation. Molby 7221 was annotated by Perry as "cf. V. plicata".

and Chihuahua,

The species is apparently endemic to Texas, being found in clay, sandy, tight, red or reddish sandy, sandy loam, and sandy gravelly soil, in loose sand or brickred-colored loose sand, on open slopes, sandy mesquite prairies, stony hills, open grassy banks, open scrub and open desert scrub, and sandy uplands, in open fields, along roadsides, in woods, and on the sandy bottoms of floodplains, at altitudes of about 50 meters, in central and southern Texas, from Coke and Houston south to Webb and Hidalgo Counties, blooming from January to May, August, September, and December, and in fruit from March to May, August, and September.

Runyon states that V. cloverae is "frequent in the west edge of Hidalgo County bordering Highway 83". The Tharp s.n. cited below from Medina County may actually have come from Frio County, as its label is merely inscribed "Devine-Dilley". Johnston, Tharp, and Turner found the species in "low scrub vegetation", while Tharp, Johnston, and Webster found it "in Catahoula tuff". Martinez encountered it in sandy soil with gravel on top and deep subsoil, "Bouteloua eriopoda dominante, pastizal de B. gracilis deteriorado."

Specimens of this species have been misidentified and distributed in herbaria under the names V. canescens var. roemeriana (Scheele) Perry, V. denticola Small, V. neomexicana (A. Gray) Small, V. neomexicana var. xylopoda Perry, V. officinalis L., V. plicata Greene, and V. xutha Lehm.

On the other hand, the McCart 7288, distributed as V. cloveri var. lilacina, is actually V. plicata Greene.

In all, 115 herbarium specimens, including the types of all the names involved, and 2 mounted clippings have been examined by me.

Citations: TEXAS: Brooks Co.: Cory 55262 (W--2007446); C. L. Lundell 10823 (N, Rf, W--1926936); Lundell & Lundell 8834 (Ld, Mi, Mi, N, N), 10072 (Ld, N, W--1888889); Painter & Barkley 14315 (Au, Au, N); Pladeck s.n. [near Falfurrias, 5-5-1940] (Bt-51188). Coke Co.: Parks & Cory 13890 (Tr). Dimmit Co.: D. S.

Correll 20734 (Rf), 20786 (Rf); Hamby 952 (Ar--206757); Johnston, Tharp, & Turner 3550 (Au--122040); Stewart & McCart 18 (Ok); Tharp & York 27 (Au--193914). Duval Co.: Alvarez, Guajardo, Salazar, & McCart 7657 (Ok). Edwards Co.: H. R. Reed 47 (N). Frio Co.: Johnston, Tharp, & Turner 3462 (Au--122042, St); Lucas, Painter, & Barkley 14230 (S, Ur); C. L. Lundell 13618 (Rf, Si, W--1926978); Lundell & Lundell 10140 (Ld, Mi, N, N, Rf, W--1835856), 13618 (N); Painter, Lucas, & Barkley 14230 (Au); H. R. Reed s.n. [Cory 27849] (N); Tharp s.n. [Dilley, 2-27-30] (Sm); Wolcott & Barkley 16271T (Au, N, S). Hidalgo Co.: Clover 578 (Du--247822, Mi); R. Runyon 2611 (N, N, N, N, N). Houston Co.: Molby 7221 (Au, Au, W--1465431). Jim Hogg Co.: Salazar & Santos 25 (Ok); Tharp, Johnston, & Webster 48-70 (Au--122052). Kenedy Co.: M. C. Johnston 541120 (Au--122041); Lundell & Lundell 10843 (N, Rf, W--1926937). Kleberg Co.: Hamby 1637 (Ar--251840, Rf); M. C. Johnston 53253.6 (Au--122044), 53253.7 (Au--122043, St); R. L. Oliver 111 (Nb); J. F. Sinclair s.n. [Kingsville, Spring, 1940] (Au). LaSalle Co.: Alvarez, Guajardo, Salazar, & McCart 7614 (Ok); F. A. Barkley 17T078 (Au, Au--178088, N); Lundell & Lundell 10142 (Ld, Mi, N); Ramirez & Perales 17 (Ok). Medina Co.: D. S. Correll 15205 (Rf, W--2178999); Tharp s.n. [Devine-Dilley, Feb. 27, 1930] (Au). Starr Co.: Clover 1618 (Fs--isotype, Fs--isotype, Mi--isotype, N--type); Lundell & Lundell 9795 (Ld, N, W--1887594), 9886 (Ld, N, W--1887598); Ripley & Barneby 9044 (N). Webb Co.: Cantu, Covell, & McCart 10 (Ok, Ok); Correll & Schweinfurth 15728 (Rf); Johnston, Tharp, & Turner 3500 (Au--122056, St); M. E. Jones 29188 (Ca--483601, Po--199867); Lundell & Lundell 10107 (Ld, Mi, N, Rf), 10141 (N); McCart 7289 (Ok, Ok); Tharp 8737 (Au), s.n. [3-15-31] (Mi). Zapata Co.: Cantu, Covell, & McCart 36 (Ok); D. S. Correll 15701 (Rf); Lundell & Lundell 10112 (Ld, N), 15052 (N, Rf, W--2297884); Ramos, Sandoval, Salazar, & McCart 7846 (Ok). MEXICO: Chihuahua: F. Martinez M.110 (Au--181446). MOUNTED CLIPPINGS: Am. Midl. Nat. 24: 751. 1940 (W); Phytologia 2: 23. 1941 (W).

VERBENA COCHABAMBENSIS Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97 & 197, nom. nud. 1942; Castanea 10: 45. 1945.

Bibliography: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97 & 197. 1942; Moldenke, Castanea 10: 42 & 45--46. 1945; Moldenke, Alph. List Cit. 4: 1198. 1949; Moldenke, Phytologia 4: 71. 1952; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Résumé 115 & 471. 1959.

Perennial herb, 15--50 cm. tall, mostly with single erect stems, but sometimes forming procumbent partial rosettes; stems

and branches slender, tetragonal, densely pubescent with short, spreading, whitish hairs; nodes annulate; principal internodes 2.2--5.8 cm. long; leaves decussate-opposite; petioles 2--12 mm. long, flat, winged, about 1 mm. wide, spreading-pubescent with whitish hairs, canaliculate above; leaf-blades pinnatisect, light-green, 1--2 cm. long, 1.5--2 cm. wide, spreading-pubescent with white hairs like those on the petioles and stems, usually with 2 or 3 lobes on each side, the lower pair usually bifurcate, the central portion along the midrib about 1 mm. wide, with the midrib impressed above, prominulous beneath, the lobes also all about 1 mm. wide, acute at the apex; inflorescence terminal, spicate; peduncles slender, 1.5--7 cm. long, spreading-pubescent like the stems; spikes elongating to 10 cm. in fruit, densely flowered; rachis slender, more or less spreading-pubescent; bractlets broadly elliptic or elliptic-ovate, sessile, 3--4 mm. long, 1.5--2 mm. wide, about half as long as the calyx, acute at the apex, whitish-pubescent; calyx tubular, about 6 mm. long, its limb about 4 mm. wide; corolla blue-lilac or purple; fruiting-calyx and fruit not known.

The type of this species was collected by my good friend and colleague, Martin Cárdenas (no. 2212) at Maica, at an altitude of 2500 meters, Cochabamba, Bolivia, in March, 1941, and is deposited in the Britton Herbarium at the New York Botanical Garden. The short broad bractlets are most characteristic. The species is said to be common on mountain slopes, and has been found among stones in sand and gravel of dry formations, from 1900 to 2700 meters altitude, flowering in December, January, and March.

In all, 6 herbarium specimens, including the type, have been examined by me.

Citations: BOLIVIA: Cochabamba: W. M. A. Brooke 5030 (Bm); Cárdenas 2212 (N--type); Eyerdam 24656 (Ca--652405); Ochoa 650 (N); Troll 1293 (B). Sucre: Hammarlund 347 (S).

xVERBENA CONATA Moldenke, Am. Midl. Nat. 59: 344. 1958.

Synonymy: Verbena halei x officinalis Dermen, Cytologia 7: 170. 1936. xVerbena adulterina Moldenke, Phytologia 5: 132. 1955 [not xV. adulterina Hausskn., 1889].

Bibliography: Nyman, Consp. Fl. Eur. Suppl. 2 (1): 245. 1889; Hausskn., Mittheil. Thüring. Bot. Ver., new ser., 10: 65. 1897; Dermen, Cytologia 7: 170. 1936; Moldenke, Phytologia 3: 467 (1951) and 5: 132. 1955; Moldenke, Am. Midl. Nat. 59: 342 & 344. 1958; Moldenke, Résumé 223, 357, 365, 371, & 471. 1959.

This name has been proposed for the hybrid produced artificially by Dermen in Massachusetts between V. officinalis L. and V. halei Small. It was first named xV. adulterina by me in 1955, but, unfortunately, that name is invalidated by the earlier xV. adulterina Hausskn., of which I was not cognizant at the time. Haussknecht's name applies to the natural hybrid between V. officinalis and V. supina L.

V. officinalis and V. halei grow together in Plaquemines Par-

ish, Louisiana, but this is the only place that I know of where the hybrid might occur in Nature. It would be most difficult to recognize in the field because of the very close similarity of the parental species to each other. Lack of abundant fruit production would probably be the quickest and easiest way to locate it. Both V. officinalis and V. halei normally produce great quantities of fruit.

VERBENA CONCEPCIONIS Moldenke, Phytologia 2: 236. 1947.

Bibliography: Moldenke, Phytologia 2: 236 & 338. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 101 & 197. 1949; Moldenke, Alph. List Cit. 3: 766. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 121 & 471. 1959.

Herb, about 40 cm. tall; stems erect, branched to the base, sparingly hirsute with stiff white hairs about 1 mm. long and standing at right angles to the stem; branches slender, each terminating, like the stem, in a single elongated spike, hirsutulous, less so in age; principal internodes 2--6.5 cm. long; leaves decussate-opposite, or the upper ones subopposite (like the branches), sessile; leaf-blades chartaceous, uniformly light-green on both surfaces, 2--2.8 cm. long, 10--21 mm. wide, widest at about the middle or slightly below, abruptly acute at the apex, long-cuneate at the base, irregularly 3-lobed, each lobe about 3-dentate with coarse subacute teeth, rough and strigose above, strigose-pubescent beneath, the venation somewhat impressed above and prominulous beneath; peduncles slender, continuous with the stems or branches, 2--6 cm. long, sparsely hirsutulous like the stems and branches; spikes many-flowered, at first dense, later elongating to 12 cm., with the fruits rather distant toward the base, more crowded toward the apex and with foliaceous bracts often subtending the lower pairs of fruits; bractlets narrow-lanceolate, about 3 mm. long, strigillose-hirsutulous, sharply attenuate-acute at the apex, almost equaling the fruiting-calyx; rachis short-pubescent and somewhat glandular; calyx about 3 mm. long, strigose with rather long white hairs and often also somewhat glandular-puberulent; corolla-tube about 5 mm. long, puberulent outside above the calyx, its limb about 2 mm. wide; fruiting-calyx not accrescent, strigose and somewhat glandular-puberulent.

The type of this perplexing species was collected by Louis Née (no. 57) at Concepcion, Chile, between 1789 and 1791, and is deposited in the herbarium of the Jardin Botanique at Madrid. The plant, known only from the type collection, is strikingly similar to the Mexican V. menthaefolia Benth., and I am wondering whether the Chilean locality may not be a case of mis-labeling. The type specimen was originally identified as V. trifida H.B.K. and actually bears two labels: one reads "Verbena ex Regno Chilensi. Née iter", while the other reads "Verbena trifida H.B.K. de la Concepcion de Chile. Née iter." Née collected both in Mexico and in Chile, so it seems quite possible that the specimen actu-

ally came from Mexico; if so, it should certainly be referred to V. menthaefolia.

In all, only 2 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: CHILE: Concepcion: Née 57 (F--photo of type, F--photo of type, N--isotype, N--photo of type, Q--type, Z--photo of type).

xVERBENA CORRUPTA Moldenke, *Phytologia* 5: 132--133. 1955.

Synonymy: Verbena peruviana x phlogiphthora Schnack, Anal.

Inst. Fitotéc. Sta. Catalina 4: 20. 1942. Glandularia peruviana x phlogiphthora Schnack & Covas, *Darwiniana* 7: 73--75, pl. 3, fig. E. 1945. Verbena peruviana x phlogiflora Dermen ex Moldenke, *Résumé Suppl.* 2: 12, in syn. 1960.

Bibliography: Schnack, Anal. Inst. Fitotéc. Sta. Catalina 4: 20. 1942; Schnack & Covas, *Darwiniana* 6: 472 (1944) and 7: 73--75, pl. 3, fig. E. 1945; Moldenke, *Phytologia* 3: 467 (1951) and 5: 132--133. 1955; Moldenke, *Biol. Abstr.* 30: 1093. 1956; Moldenke, *Am. Midl. Nat.* 59: 344--345. 1958; Moldenke, *Résumé* 223, 296, 372, & 471. 1959; Moldenke, *Résumé Suppl.* 2: 12. 1960.

Illustrations: Schnack & Covas, *Darwiniana* 7: pl. 3, fig. E. 1945.

This name has been proposed for the artificial hybrid produced in Argentina between V. peruviana (L.) Britton and V. phlogiflora Cham. The two parental species grow together in at least two states of Brazil, in Paraguay, in Uruguay, and in at least two provinces of Argentina. It is, therefore, quite probable that this hybrid occurs there in the natural state. It should have considerable horticultural merit and should also be of interest in possibly shedding light on the supposed origin of the common garden verbena known as xV. hybrida Voss.

VERBENA CORYMBOSA Ruiz & Pav., *Fl. Peruv. & Chil.* 1: 22, pl. 33a, fig. 1--5. 1798 [not V. corymbosa Cham., 1832, nor Hort., 1845, nor Relh., 1947].

Synonymy: Zapania corymbosa (Ruiz & Pav.) Poir. in Lam., *Encycl. Méth. Bot.* 8: 844. 1808. Zapania corymbosa Poir. ex Schau. in A. DC., *Prodr.* 11: 540, in syn. 1847. Verbena aspera Kunze ex Walp., *Repert. Bot. Syst.* 4: 33, nom. nud. 1845 [not V. aspera Gill. & Hook., 1830, nor Hügel, 1936]. Verbena arechavaletae Osten ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 22, in syn. 1947. Verbena palustris Poepp. ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 26, in syn. 1947.

Bibliography: Ruiz & Pav., *Fl. Peruv. & Chil.* 1: 22, pl. 33a, fig. 1--5. 1798; Poir. in Lam., *Encycl. Méth. Bot.* 8: 844. 1808; J. Sm. in Rees, *Cycl.* 36: no. 20, 1817; Spreng. in L., *Syst. Veg.* ed. 16, 2: 748. 1825; Cham., *Linnaea* 7: 255. 1832; Walp., *Repert. Syst. Bot.* 4: 26--27 & 33. 1845; Schau. in A. DC., *Prodr.* 11: 539--540. 1847; C. Gay, *Hist. Chile Bot.* 5: 23. 1849; Jacks.,

Ind. Kew. 2: 1178. 1895; Reiche, Fl. Chile 5: 283 & 285. 1910; Gard. Chron., ser. 3, 86: 58 & 63. 1929; Journ. Roy. Hort. Soc. Lond. 55, Proc. 131. 1930; C. Elliott, Gard. Chron., ser. 3, 90: 290. 1931; Stapf, Ind. Lond. 6: 429. 1931; Milne-Redhead in Curtis, Bot. Mag. 157: pl. 9361. 1934; L. H. Bailey, Cat. Florists Handl. Verbenac. mss. 1935; Moldenke, Prelim. Alph. List Invalid Names 54. 1940; Moldenke, Suppl. List Common Names 6 & 23. 1940; Worsdell, Ind. Lond. Suppl. 2: 486. 1941; Moldenke, Lilloa 6: 326 (1941) and 8: 429. 1942; Moldenke, Alph. List Invalid Names 57. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35, 42, & 101. 1942; Schnack, Anal. Inst. Fitotéc. Sta. Catalina 4: 19. 1942; Schnack & Covas, Darwiniana 6: 470. 1944; Moldenke, Lilloa 10: 346. 1944; Darlington & Janaki Ammal, Chromosome Atl. 270. 1945; Moldenke, Phytologia 2: 114. 1945; Moldenke, Alph. List Cit. 1: 6 & 59. 1946; Moldenke, Phytologia 2: 337. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 22 & 26. 1947; Moldenke, Castanea 13: 117 & 121. 1948; Moldenke, Alph. List Cit. 2: 457, 554, & 571 (1948), 3: 671, 672, 766, 781, 811, 812, 823, & 840 (1949), and 4: 1104, 1116, 1117, 1166, 1187, & 1191. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73, 94, 100, 101, 164, & 197. 1949; Moldenke, Am. Wild Fls. 364 & 450. 1949; C. Elliott, Illustr. Lond. News 217: no. 5810, August 26. 1950; Moldenke, Phytologia 3: 288 (1950) and 3: 467. 1951; Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 53. 1951; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2208—2210. 1951; Moldenke, Phytologia 5: 96. 1954; Moldenke, Journ. Calif. Hort. Soc. 15: 82. 1954; Moldenke, Résumé 84, 110, 119, 121, 223, 357, 371, 393, & 471. 1959; Reitz, Sellowia 11: 57 & 134. 1959; T. H. Everett, New Illustr. Encycl. Gard. 13: 2404. 1960; Moldenke, Résumé Suppl. 2: 10. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Moldenke, Résumé Suppl. 3: 42. 1962.

Illustrations: Ruiz & Pav., Fl. Peruv. & Chil. 1: pl. 33a, fig. 1--5. 1798; Milne-Redhead in Curtis, Bot. Mag. 167: pl. 9361 (in color). 1934; C. Elliott, Illustr. Lond. News 217: no. 5810, fig. 1 & 2, August 26. 1950.

Perennial herb, 1 m. or less in height, spreading underground by means of a creeping rhizome; stems erect, simple or corymbosely branched above, 4-angled, striate, leafy, more or less pilose-hispidulous throughout; principal internodes 5--9 cm. long; leaves decussate-opposite, very short-petiolate or sessile; leaf-blades varying from oblong or ovate to subcordate-ovate, often subtriangular or cordate-triangular, 2.5--6.5 cm. long, 1.2--2.5 cm. wide, paler beneath, rigid, acute at the apex, truncate at the base, subrevolute-margined, strigose-hispidulous or densely appressed-pilose on both surfaces, unequally mucronate-dentate or deeply incised-serrate, often with a small entire or toothed lobe on each side near the base, reticulate-veined and rugose with deeply impressed venation above, the venation prominent beneath, the upper ones usually with a non-cordate base, the lower ones often subtrilobed; inflorescence a terminal corymbose panicle, the spikes short, about 2.5

cm. long, numerous, very dense, mostly ternate or subternate, the flowers imbricate; peduncles short; bractlets linear or ovate, from half as long as to almost equaling or even surpassing the calyx, subulate-acuminate at the apex, pilose-setose on both surfaces, ciliate-margined; calyx cylindric, 5--6 mm. long, pilose-setose or glandular-hirtous, its rim shortly 5-denticulate or subulate-5-fid; corolla blue or violet, its tube twice as long as the calyx, slender, usually reddish-purple, puberulent on the outside, lanuginous in the throat, the limb medium in size, usually heliotrope-blue, the lobes about 4 mm. long, retuse at the apex; fruit about half as long as the mature calyx; chromosome number: $2n = 56$.

The type of this distinctive species was collected by Hipólito Ruiz and José Antonio Pavon somewhere in Chile. The type of *V. palustris* was collected by Eduard Friedrich Poeppig (III.157 -- cited by Schauer as "II.157") at Laguna de San José Cantera, on the island of Laja [Laja], Bío-Bío, Chile, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The type of *V. aspera* is also a Poeppig collection in the Berlin or DeCandolle herbarium. The type of *V. arechavaletae* was collected by José Arechavaleta [Herb. Osten 3745] in a swamp at Bañados de Carrasco, department of Montevideo, Uruguay, and is deposited in the herbarium of the Museo Nacional at Montevideo. Osten, on August 20, 1899, described it as follows: "Verbenaca, Pachystachyae -- juxta *V. ovata* Cham. inserrenda. Rhizomate repente, caulibus angulatis, ascendentibus apice ramosis, superne ramisque glanduloso-villosis, strigosisque scabris. Foliis oppositis ovatis acutis, grosse crenatis, subcordatis, brevissime petiolatis vel subsessilibus, supra rugosis strigisque subcallosis scaberimis, subtus in rete prominente praecipue hirsutis. Panicula terminali contracta, spicis cylindricis imbricatis, bracteis lanceolatis margine longe ciliatis calycem subaequantibus, corollae violaceae (?) tubo extus villosa, calycem $1/3$ excedente." Apparently he never published this description, and later he changed his determination of the specimen to *V. ovata* Cham.

The species inhabits mostly wet soil, and has been found in marshes, bogs, swamps, river banks, wet thickets, damp depressions, wet places, and low wet places in general; also on campos, in virgin forests, in turf on dunes, and on rocky crests, at altitudes of 50 to 1650 meters, blooming from October to February. It has been collected in fruit in December. In cultivation in the Northern Hemisphere it is said to be hardy, blooming in summer, and growing best in moist soil in sunshine. It was introduced into cultivation in 1928. Rambo has found it in a region of 2 meters rainfall and 0° to 25° temperature. Reitz & Klein describe the corolla as "roxa".

Bailey (1935) says that its seeds are offered in the horticultural trade by Kew and Lissadell. The J. T. Howell s.n. cultivated at San Francisco, California, on June 16, 1941, was grown from seed collected in Chile by Clarence Elliott, who describes

the plant as follows: "I collected one other Verbena in Chile, Verbena corymbosa, a herbaceous plant, and in some ways perhaps the most valuable of them all for garden purposes. I saw it first from the train as we neared Valdivia. Every stream and ditch was lined with violet, which turned out to be this Verbena. It's a splendid plant, both as a feature in the landscape and as a slab of colour in the flower border. A group of a dozen specimens planted two years ago in my garden has been in flower for several weeks, and is good for several more. They have grown together into a patch about 6 ft. by 3 ft., which now, in mid-August, has all the appearance, in colour and in individual flower-heads, of a clump of particularly well-grown, well-flowered heliotrope. The resemblance is quite remarkable, and, oddly enough, the flowers have the true heliotrope scent, though it is not quite so heavily overpowering. Verbena corymbosa has received the Award of Merit R. H. S., and has been figured in the 'Botanical Magazine.' Although in nature a damp-loving plant, it grows and flowers to perfection in good loam in the herbaceous border. I have found it quite reliably hardy, and one of the easiest things in the world to propagate from cuttings. In flower it stands about 18 ins. high, and so is best suited for the front of the border, and though I have not tried it as a waterside plant, I have not the least doubt that it would flourish there, as it does by the streams around Valdivia. I once saw a magnificent border of Verbena corymbosa in a Cheshire garden. It was 3 ft. wide, 30 or 40 yards long, and a solid mass of heliotrope from end to end. And yet this jolly plant of many virtues is comparatively little known. Can it be that on seeing it growing in a garden folk conclude that a plant so very like a heliotrope could not possibly be hardy? That may be the reason. Perhaps the plant's greatest virtue is that, being without a touch of vulgarity, it is never likely to be over-planted and vulgarised. But I wish more really nice gardeners would wake up to the beauty and good nature of my Chilean ditch weed."

Reiche (1910) says "Planta ornamental de los matorrales húmedos desde la provincia de Concepcion a Valdivia. Enero, Febrero!" Everett (1960) says "Verbena corymbosa is a herbaceous plant of running habit, forming clumps of dark-green, rough foliage; in June and July it throws up numerous erect branched stems carrying heads of flowers of purple and red-violet color with the delicious fragrance of Heliotrope. The plant is hardy in milder parts of North America and thrives in moist, loamy soil. It has value in the flower border and as a cut flower. It was introduced into cultivation from southern Chile in 1928. V. corymbosa is easily propagated by division of the roots, by cuttings taken in spring and rooted in sand in a cold frame, or from seeds sown in a mixture of loam, leaf mold or peat moss and sand in a cold frame."

Common names reported for the species are "camaradinha", "correcaballito", "corymbose Chili vervain", "corymbose vervain", "formosa sem dote", "jurupeba", "verbena", and "verbena corre-

cabillito". The three names before the final one in this list, however, are applied to many other species of this genus and even to related genera.

Specimens of V. corymbosa have been misidentified and distributed in herbaria under the names V. bonariensis L., V. hispida Ruiz & Pav., V. venosa Gill. & Hook., and even Stachys sp. in the Lamiaceae.

It is worthy of note here that the Verbena aspera of Gillies & Hooker is Junellia aspera (Gill. & Hook.) Moldenke, while that of Hügel is Priva cordifolia (L. f.) Druce, and the V. corymbosa of Chamisso [who says "E Brasilia misit Sellowius pluribus locis lectam"] and of Relh. is V. lobata Vell., while V. corymbosa Hort. is V. bonariensis L. Walpers (1845) gives V. lobata Arrab. as a synonym of V. corymbosa Ruiz & Pav., but actually this name belongs in the synonymy of V. lobata Vell., a very different Brazilian species. Walpers classifies our plant in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Macranthae and Secondary Subgroup Melindres with ten other species. He also claims that our plant has much of the habit of a Thalictrum.

Schauer cites Dombey 264 from Peru in the Berlin or DeCandolle herbarium. Acevedo de Vargas (1951) cites the following 7 specimens not as yet seen by me: CHILE: Curicó: Collector undesignated s.n. [XII.1861] (Sg--42453). Ñuble: J. Gallardo s.n. [II.XI.1947] (Sg--66315). Valdivia: Collector undesignated s.n. [S. Juan, I. 1886] (Sg--68336), s.n. [II.1862] (Sg--42456); Philippi s.n. [I. 1861] (Sg--54699), s.n. [II.1878] (Sg--42448, Sg--54698).

In all, 62 herbarium specimens, including the types of several of the names involved, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 4223 (Ok). Rio Grande do Sul: Rambo 34724 (Gg--354823, N, S), 49364 (N, S); A. R. Schultz 506 (N); Sehnem 4155 (B). Santa Catarina: Reitz 2334 (N), 3261 (N), 3770 (S, S); Reitz & Klein 8211 (Mm); Smith & Reitz 8977 (Ok, W--2251475), 10177 (N, Ok, W--2251657), 10463 (Ok, W--2251681). URUGUAY: Arechavaleta 35 [3136] (Ug), 85 (Ug), s.n. [Bañados de Carrasco; Herb. Osten 3745] (Ug); Gallinal s.n. (Ug--5844); Legrand 1366 (Ug), 4323 (Ug); Lombardo 3113 (N); Osten 4052 (Ug). CHILE: Bío-Bío: Poeppig III.157 (Br). Cautín: Claude-Joseph 1889 (W--1122289); Hollermayer 62 (B); Pfister XVI [Looser 4380] (N); Sparre 3520 (S). Malleco: Kunkel 416 (Z). Valdivia: Alcibiades Santa Cruz s.n. [Cordillera de la Costa, 1938] (Ba); Barros Valenzuela 8043 (N); Bridges 784 (M, M), s.n. (Br); Buchtlen s.n. [Cutipai, 18/2/1904] (S, Vt), s.n. [Cutipai, Feb. 1904] (W--1159369); Gunckel 3053 (W--1618821), 13766 (N); Herb. Mus. Nac. Chile 2 (N); Hollermayer s.n. [Werdermann 1170] (Bm, Ca--

323056, Gg--149971, N, S, Ut--91126, W--1516845); H. Krause s.n. [Coral] (W--1690232); Kunkel s.n. [Jan. 14, 1959] (Sm); R. A. Philippi s.n. [Valdivia] (W--1323078). Province undetermined: Claude-Joseph 5823 (W--1444388); Née 91 [Coscolen] (Q); R. A. Philippi 297 (S). CULTIVATED: California: J. T. Howell s.n. [San Francisco, June 16, 1941] (Gg--290629); Walther s.n. [Santa Monica, June 1930] (Gg--178810), s.n. [San Francisco, July 1, 1932] (Gg--195533); J. West s.n. [San Rafael, May 30, 1933] (Gg--214253).

xVERBENA COVASII Moldenke, *Phytologia* 2: 146. 1946.

Synonymy: Glandularia santiaguensis x laciniata Schnack & Covas, *Darwiniana* 7: 73--75 & 77--79, pl. 1, fig. D, & pl. 5, fig. A--G. 1945; *Rev. Argent. Agronom.* 12: 228. 1945.

Bibliography: Schnack & Covas, *Darwiniana* 7: 73--75 & 77--79, fig. 2B, pl. 1, fig. D, & pl. 5, fig. A--G. 1945; Schnack & Covas, *Rev. Argent. Agronom.* 12: 228. 1945; Schnack & Gonzalez, *Rev. Argent. Agronom.* 12: 290. 1945; Moldenke, *Phytologia* 2: 146. 1946; Moldenke, *Alph. List Invalid Names Suppl.* 1: 10 & 26. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 164 & 197. 1949; Moldenke in Chittenden, *Roy. Hort. Soc. Dict. Gard.* 4: 2210. 1951; Moldenke, *Am. Midl. Nat.* 59: 345. 1958; Moldenke, *Résumé* 223, 296, 373, 376, & 471. 1959.

Illustrations: Schnack & Covas, *Darwiniana* 7, fig. 2B, pl. 1, fig. D, & pl. 5, fig. A--G. 1945.

This name was proposed for the artificially produced hybrid between V. santiaguensis (Covas & Schnack) Moldenke and V. tenuisecta Briq. The two parental species grow together in Corrientes, Argentina, and the hybrid may be expected in the wild state there. It ought to have considerable horticultural merit and may therefore be worthy of further experimentation. In previous publications I regarded this as a hybrid between V. santiaguensis and V. laciniata (L.) Briq., but it appears most likely that what Schnack & Covas called "Glandularia laciniata" was actually Verbena tenuisecta. Verbena laciniata and V. tenuisecta grow together in at least two provinces of Argentina.

xV. covasi was first produced in 1945. Schnack & Covas describe it as follows: "En general el híbrido presenta caracteres intermedios con respecto a los de los padres. La pubescencia en toda la planta está formada por pelos oblicuos o apretados. La corola es de color pálido, exteriormente glabra. Las hojas (lámina V B, centro) y los mericarpios (fig. 2, B) son intermedios... La observación microscópica de los granos de polen tratados con lugol, indica una proporción de esterilidad próxima al 50 o/o (ver tabla I y lámina V A). Los granos de polen estériles son de tamaño normal, pero no dan la coloración típica de los granos fértiles tratados con lugol. En cambio en una de los padres, G. santiaguensis, en que también hay un 50 o/o de granos fértiles, los granos no funcionales son abortivos, es decir no adquieren

el tamaño de los granos fértiles y son de forma irregular.....En la lámina V C, D, E, F y G se presentan configuraciones cromosómicas observadas en distintos estudios de la meiosis del híbrido G. santiaguensis x G. laciniata. La relación evidente entre miembros de dos pares de cromosomas, como se observa en diplotene y en la cadena de cuatro cromosomas en diacinesis y metafase I, indican que G. santiaguensis x G. laciniata es un híbrido estructural, probablemente heterocigota para una translocación simple. Aunque hemos observado en varias ocasiones cadenas de cuatro cromosomas, no hemos encontrado anillos cromosómicos. La esterilidad del 50 o/o en el polen debe atribuirse a este comportamiento cromosómico aberrante."

VERBENA CRITHMIFOLIA Gill. & Hook. in Hook., Bot. Misc. 1: 169. 1829.

Synonymy: Verbena crithmifolia var. latiloba Speg., Anal. Soc. Cient. Argent. 53: 250. 1902. Glandularia crithmifolia (Gill. & Hook.) Schnack & Covas, Darwiniana 6: 475. 1944. Verbena crithmifolia Hook. & Arn. ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena crithmifolia Gill. ex Moldenke, Lilloa 10: 382, in syn. 1944. Verbena crithmifolia latiloba Speg. ex Moldenke, Résumé 362, in syn. 1959. Verbena critmifolia Gill. & Hook. ex Moldenke, Résumé Suppl. 3: 37, in syn. 1962. Landularia crithmifolia Gill. & Hook., in herb.

Bibliography: Hook., Bot. Misc. 1: 169. 1829; Walp., Repert. Syst. Bot. 4: 30. 1845; Schau. in A. DC., Prodr. 11: 549 & 556. 1847; R. A. Phil., Anal. Univ. Chil. 35: 190. 1870; Lorentz, Veg. Nordeste Prov. Entre Ríos, ed. 1, 150. 1878; Griseb., Abh. K. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 277. 1879; Lorentz & Niederl., Exped. Rio Negro 2 (bot.): 264. 1881; Jacks., Ind. Kew. 2: 1178. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 255. 1898; Speg., Anal. Soc. Cient. Argent. 53 [Nov. Add. Fl. Patag. 2: repr. 72]: 249--250. 1902; Hauman-Merck, Anal. Mus. Nac. Nat. Hist. Buenos Aires 24: 415. 1913; Hicken, Physis 2: 114. 1916; Sanzin, Anal. Soc. Cient. Argent. Buenos Aires 88: 98, 131--132, & 134. 1919; Molfino, Physis 5: 22. 1921; Seckt, Rev. Univ. Nac. Cordoba 17: 90. 1930; Stapf, Ind. Lond. 6: 429. 1931; Moldenke, Lilloa 6: 326--327 (1941) and 8: 429. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Beetle, Bot. Review 9: 670. 1943; Schnack & Covas, Darwiniana 6: 475. 1944; Moldenke, Lilloa 10: 382--383. 1944; Ind. Taxon. 1 (14--16): 6. 1945; Covas & Schnack, Revist. Argent. Agronom. 12: 59. 1945; Cabrera, Bol. Soc. Argent. Bot. 1: 67. 1945; P. I. Acuña, Cat. Fl. Catamarq. 30. 1945; Schnack & Covas, Darwiniana 7: 71, 72, 74, & 75. 1945; Covas & Schnack, Darwiniana 7: 85. 1945; Moldenke, Phytologia 2: 68 & 114. 1945; Schnack & Covas, Bol. Soc. Argent. Bot. 1: 282. 1946; Moldenke, Alph. List Cit. 1: 84, 86, 95--97, 101, & 102. 1946; Moldenke, Phytologia 2: 335. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 9 & 23. 1947; Lorentz, Veg. Nordeste Prov. Entre Ríos, ed. 2, 150. 1947; Molden-

ke, Alph. List Cit. 2: 375, 537, 575, 584, & 598 (1948), 3: 673, 696, 735, 766, 798, & 924 (1949), and 4: 1299. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 70, 105, & 197. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; Moldenke, Phytologia 3: 76 (1949) and 3: 290. 1950; J. H. Hunziker, Revist. Invest. Agric. 6 (2): 175, 183, & 192. 1952; E. J. Salisb, Ind. Kew. Suppl. 11: 101. 1953; Moldenke, Résumé 80, 121, 127, 295, 362, & 471. 1959; Moldenke, Résumé Suppl. 3: 37. 1962.

Illustrations: Sanzin, Anal. Soc. Cient. Argent. Buenos Aires 88: 132. 1919.

Erect perennial herb, 40--75 cm. tall, or semi-woody shrub or subshrub, scabrous or hispid throughout; leaves decussate-opposite, thick-textured, almost fleshy, bipinnatifid, scabrous with very short, erect, rigid hairs, the segments linear, generally more than 2.5 mm. wide, obtuse at the apex, canaliculate, revolute-margined; spikes oblong, dense; bractlets linear, with glandular hairs equal to or longer than the simple ones; flowers fragrant; calyx ovate-oblong, with glandular hairs equal to or longer than the simple ones, the teeth rather obtuse; corolla varying from clear-blue or light-blue to lilac, lavender, rose, violet, pale-violet, or purplish, or pale-purplish, sometimes lilac-white or whitish, twice as long as the calyx, with simple hairs on the outer surface; upper anthers with large, club-shaped, glandular appendages, exserted; pollen fertility about 93.2 o/o; mericarps acutely triquetrous, 5--6 mm. long, not recurved at the apex; chromosome number: $2n = 20$.

The type of this species was collected by John Gillies in the Andes Mountains at or near Mendoza, Argentina. The original publication is given as "1830" by some authors, but the correct date seems to be 1829. The type of var. latiloba was collected at the junction of the Limay and Neuquen rivers in Patagonia.

The species is classified by Walpers (1845) in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Macranthae, and Secondary Subgroup Aubletia, with ten other species. Schauer (1847) places it among his "Species non satis notae" and suggests that it may be closely related to his V. pinnatisecta Schau. In his discussion of the latter he says "Proxima videtur V. crithmifoliae, quae vero ex descr. differt foliorum laciniis angustioribus linearibus, bracteis linearibus, calycis dentibus obtusiusculis et corolla calyce duplo longiore." I regard V. pinnatisecta as a synonym of V. filicaulis Schau., with which Schauer compares V. crithmifolia f. minor Gill. & Hook. [which I regard as a synonym of V. hookeriana (Covas & Schnack) Moldenke]. Covas & Schnack differentiate these two closely related species as follows:

1. Segments of the leaves generally less than 2 mm. wide; pubescence on the leaves subappressed; upper anthers without glandular appendages; glandular hairs on the bractlets and calyx shorter than the simple ones; pubescence on the exterior of the corolla mostly glandular; mericarps 4 mm.

long, recurved ventrally at the apex.....V. hookeriana.
 la. Segments of the leaves generally more than 2.5 mm. wide; pubescence on the leaves very short but erect and rigid, imparting a scabrous aspect; upper anthers with large club-shaped, exserted, glandular appendages; glandular hairs on the bractlets and calyx equal to or longer than the simple ones; pubescence on the exterior of the corolla simple, not glandular; mericarps 5--6 mm. long, not recurved at the apex.....V. crithmifolia.

Verbena crithmifolia inhabits dry places in general, roadsides, very dry plateaus, hills, arroyos, conglomerate uplands, and dry rocky hills, and rock crevices on slopes in association with Opuntia, at altitudes of 50 to 3000 meters, flowering from September to April, fruiting in January and February. Semper says that it is "abundant in dry alluvial soil" in Mendoza, where Ruiz Leal also reports it as "abundant". The length of pistil in relation to the size of the pollen grains is discussed by Covas & Schnack in Darwiniana 7: 85 (1945). Hunziker reports that the species is employed as a blenorrhagic. Common names reported for it are "bichicho", "té de burro", and "yerba del incordio".

Hauman-Merck (1913) cites his no. 352 and Spegazzini 449 from Río Negro, Argentina, where it is said to be not rare in dry places between the Río Colorado and the Río Negro. The Castillanos s.n., Castillon s.n., Kuntze s.n., Kurtz 8440, Lorentz & Hieronymus s.n., and Schreiter 6428 & 10612, cited in Lilloa 6: 326--327 (1941) and 10: 382 (1944) as this species, and the Venturi 6725 & 6939, H. H. Bartlett 19918, 19934, 19955, 19550, 20149, & 20231, Isler 117a, Jørgensen 1019, Kuntze s.n. [San José de Morro, 3/1/92], Lorentz s.n. [Südlich von El Chañar, 28 Nov. 1871], T. Meyer 4090, Schreiter 10612 [Herb. Inst. Miguel Lillo 32861], and Troncoso 6021, distributed as this species, are all V. hookeriana (Covas & Schnack) Moldenke.

In all, 66 herbarium specimens, including the type collections of all the names involved, and 2 mounted photographs, have been examined by me.

Citations: ECUADOR: Guayas: Née 70 (Q), 82 (Q). CHILE: Ovalle: Barros Valenzuela 8009 (N). ARGENTINA: Buenos Aires: Chicchi 28 (N, N); Née 81 (Q). Catamarca: Job 1337 (N). Córdoba: Cabrera 6391 (N); Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 31202] (N); Lossen 8 (Ba). La Pampa: Cabrera 4362 (N); Chicchi 264 (N), 287 (N). La Rioja: Hieronymus & Niederlein 99 (Vt). Mendoza: F. A. Barkley 19Ar803 (N); H. H. Bartlett 19372 (Mi, W--1904440); Bodenbender s.n. [Herb. Kurtz 10010] (Ja, Ja--1839, N); Burkart, Troncoso, & Nicora 14270 (N); Gillies s.n. [Mendoza; Gillies & Hooker 857; Macbride photos 34346] (Kr--photo of isotype, Lu--isotype, N--photo of isotype); Jensen-Haarup s.n. [St. Rosa] (Cp, N--photo, Z--photo); Jørgensen 102a (Cp); Lourteig 894

[Herb. Inst. Miguel Lillo 113925] (Ca--166001), 925 (Ca--165696); Melis, Araque Molina, & Barkley 19Ar903 (N); Osten 5131 (N, Ug); Paci 514 (Au--122055, Go, N, St); Parodi 12807 (N); Ruiz Leal 961 (N), 3516 (N), 4063 (N), 6242 (N), 6382 (N), 6983 (N), 7308 (N), 7675/24 [Goodspeed 31024] (Z), 8413 (N, Ut--115421b), 9476 (N); Ruiz Leal & Paci 476 (N); Sanzin 898 [Herb. Osten 12806] (Ug); Semper 439 (N), 585 (S), s.n. [Ruiz Leal 4349] (N), s.n. [Ruiz Leal 9406] (N), s.n. [Ruiz Leal 10218] (N), s.n. [Ruiz Leal 10280] (N); Senn 4389 (Go, N, Vi, W--1995298). Neuquen: Fabris 806 (N, W--2144762). Rio Negro: Eyerdam, Beetle, & Grondona 23541 (Ca--627530); W. Fischer 90 (Cm, Ur, W--704268); O'Donell 1844 (S); Scala 11 (N); Senn 4208 (N). San Juan: Cuezzo 2032 (N).

VERBENA CUMINGII Moldenke, *Phytologia* 2: 146--147. 1946.

Synonymy: Shuttleworthia cumingii Miers, in herb.

Bibliography: Moldenke, *Phytologia* 2: 146--147. 1946; H. N. & A. L. Moldenke, *Pl. Life* 2: 55. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 101 & 197. 1949; Moldenke, *Alph. List Cit.* 4: 1215. 1949; Moldenke, *Phytologia* 3: 290. 1950; E. J. Salisb., *Ind. Kew. Suppl.* 11: 263. 1953; Moldenke, *Résumé* 121 & 471. 1959; Moldenke, *Résumé Suppl.* 3: 14. 1962.

Herb; stems apparently procumbent, ascending at the tips, stramineous, tetragonal, hirsute with long, white, spreading or reflexed hairs; principal internodes 2--3.5 cm. long; nodes annulate, densely hirsute; leaves decussate-opposite, usually with an abbreviated branch in each axil, the branch very leafy and very hirsute; petioles about 5 mm. long or slightly longer, broadly winged and indistinguishable from the lamina; leaf-blades thin-chartaceous, uniformly green on both surfaces, deeply dissected or bipinnatifid, to 4 cm. long, strigose on both surfaces, the lobes subacute at the apex, the margins slightly revolute; midrib and secondaries very slender, obscure above, prominulous beneath; inflorescence solitary at the end of each stem; peduncles erect, elongate, 15--17 cm. long, rather more sparsely hirsutulous than the stems but similar in color and texture, terminated by a pair of opposite flowers with their subtending bractlets and, about 1 cm. beyond them, a dense head of flowers; bractlets lanceolate, 8--9 mm. long, about 1 mm. wide at the base, long-attenuate at the apex, hirsute-ciliate along the lower margins and short-strigillose on the back and toward the apex on the margins; calyx tubular, 10--11 mm. long (including the teeth), strigose with appressed whitish hairs of several lengths, its rim irregularly 5-toothed, the teeth long-attenuate, 1--2 mm. long; corolla large, showy, its tube projecting 2--3 mm. from the calyx, smooth on the outer surface, the limb about 12 mm. wide, the lobes deeply bilobed at the apex; anther-appendages large, black, conspicuously exerted.

The type of this species was collected by Hugh Cuming (no. 908) -- in whose honor it is named -- near Coquimbo, Coquimbo,

Chile, sent to the Martius herbarium in 1835, and deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The species has been collected in anthesis in September. Barros Valenzuela says that the flowers are "coffee-colored", but just what he means by this is not certain. The species appears to be very closely related to V. paulseni R. A. Phil. and may even prove to be conspecific with it.

In all, 6 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: CHILE: Coquimbo: Barros Valenzuela 1374 (N), 8038 (N); Cuming 908 (Bm--isotype, Br--type, N--isotype, N--photo of type, Z--photo of type). Santiago: Claude-Joseph 1809 (W--1121335).

VERBENA CUNEIFOLIA Ruiz & Pav., Fl. Peruv. & Chil. 1: 22, pl. 32a. 1798 [not V. cuneifolia Hort., 1960, nor Raf., 1808, nor Wallberg, 1959].

Synonymy: Verbena cuneiformis Ruiz & Pav. ex Poir. in Lam., Encycl. Méth. Bot. 8: 546. 1808. Verbena tetrandra, foliis trifidis; laciniis incisis; spicis ternis, oblongis Ruiz & Pav. ex Poir. in Lam., Encycl. Méth. Bot. 8: 546, in syn. 1808. Verbena cuneiformis Spreng. ex J. Sm. in Rees, Cycl. 36: no. 25. 1817. Verbena cuneifolius R. & P. ex F. L. Herrera, Sinop. Fl. Cuzco 1: 352, sphalm. 1941.

Bibliography: Ruiz & Pav., Fl. Peruv. & Chil. 1: 22, pl. 32a. 1798; Raf., Med. Repos. N. Y., ser. 2, 5: 360. 1808; Poir. in Lam., Encycl. Méth. Bot. 8: 546. 1808; J. Sm. in Rees, Cycl. 36, no. 25. 1817; Spreng. in L., Syst. Veg., ed. 16, 2: 750. 1825; Walp., Repert. Syst. Bot. 4: 31. 1845; Schau. in A. DC., Prodr. 11: 539. 1847; C. Gay, Hist. Fis. Chile Bot. 5: 23. 1849; Sanzin, Anal. Soc. Cient. Argent. 88: 98, 113, 114, & 134. 1919; Stapf, Ind. Lond. 6: 429. 1931; Moldenke, Prelim. Alph. List Invalid Names 45. 1940; F. L. Herrera, Sinop. Fl. Cuzco 1: 352. 1941; Moldenke, Alph. List Invalid Names 46. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35, 42, & 101. 1942; Raimondi, Bol. Mus. Hist. Nat. Jav. Prado 7: 243. 1943; Moldenke, Alph. List Cit. 1: 163 (1946) and 3: 687. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73, 101, & 197. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 13. 1949; Moldenke, Phytologia 4: 267. 1953; Moldenke, Résumé 84, 121, & 471. 1959; Moldenke, Résumé Suppl. 2: 11 (1960) and 3: 13, 37, & 41. 1962.

Illustrations: Ruiz & Pav., Fl. Peruv. & Chil. 1: pl. 32a. 1798.

Perennial herb, 0.6--3 m. tall, woody below; stems erect, tetragonal, branched from the base or subsimple and corymbose above, hispidulous; leaves decussate-opposite, coriaceous, sessile or subsessile, broadly ovate or cuneiform in outline, 4--5 cm. long and wide, cuneate-coarctate or semi-amplexicaul at the base, deeply trifid, strigose-hispid on both surfaces,

the segments lanceolate, incised-dentate or incised-pinnatifid, coarsely serrate, acute at the apex; spikes terminal, simple or subternate, about 2.5 cm. long, short-pedunculate or subsessile, oblong and compact, finally cylindric, subcanescent, strigose-hispid and glandulose; peduncles about 2.5 cm. long; bractlets lanceolate, about one-third as long as the calyx, subulate at the apex; flowers very decorative, fragrant; calyx about 8 mm. long, canescent-hispid, the rim 5-fid, the lobes acute or subulate; corolla varying from blue, deep-blue, dark-blue, or purplish-blue to violet, purple, bright-purple, or rich-purple, usually pale in the throat, its tube cylindric-subinfundibular, somewhat longer than the calyx, the uppermost third above the calyx pubescent, the limb medium-sized, deeply 5-fid; fruiting-calyx constricted above, twice as long as the fruit; cocci reticulate-tuberculate above.

This species has been collected in thickets, along roadsides, in sandy places, in deep soil of canyons, and among shrubby growth in fertile black soil, at altitudes of 3200 to 3600 meters, flowering in January, March to June, September, and November, and fruiting in May. Soukup says that it is locally common in Junín, Peru. Gay (1849) says that it occurs "en las cordilleras de Chile entre Santiago y Mendoza". Common names recorded for it are "cara huanzuy", "China-verbena", "verveine cunéiforme", and "wedge-leaved vervain".

Walpers (1845) classifies it in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Macranthae, and Secondary Subgroup Aubletia, with ten other species. Schauer (1847) places it in Section Verbenaca, Subsection Pachystachyae, with 21 other species.

Schauer cites Dombey 261 and Ruiz & Pavon s.n. from Huánuco and from Mayubamba, Peru, in the Berlin and De Candolle herbaria, the latter being the type collection of the species. Herrera (1941) cites his no. 1409 from Cuzco, Peru. Raimondi (1943) cites his no. 10255 from Huancavelica, 1535 & 12032 from Ancash, 2558 from Junín, and 8929 from Department undetermined, Peru.

It is worth noting that the V. cuneifolia of Rafinesque is V. stricta Vent., that of Wallberg is V. simplex Lehm., and that of Hort. is V. hispida Ruiz & Pav.

The H. H. Rusby 911, distributed as V. cuneifolia, is the type collection of V. bangiana Moldenke; Cook & Gilbert 99 is V. hayekii Moldenke; F. W. Pennell 14582 and Wilkes s.n. [Obrajillo] are V. hispida Ruiz & Pav.; and Cook & Gilbert 373 is V. parvula Hayek.

In all, 12 herbarium specimens and 2 mounted photographs have been examined by me.

Citations: PERU: Ayacucho: Killip & Smith 23294 (N, W--1358-017). Junín: Killip & Smith 22124 (N, W--1357172); Kunkel 383 (Gg); Macbride & Featherstone 1210 (W--1474583); Soukup 3537

(Gg--353772, N, W--1930168); Stork 10920 (Ca--655732). La Libertad: A. Lopez Miranda 310 (N, Z). Department undetermined: Dombey s.n. [Macbride photos 17411] (Kr--photo, N--photo).

VERBENA CURTISII Moldenke, Phytologia 2: 147--148. 1946.

Synonymy: Verbena caroliniana L. ex Moldenke, Phytologia 2: 148, in syn. 1946.

Bibliography: Moldenke, Phytologia 2: 147--148. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 55. 1948; Moldenke, Alph. List Cit. 4: 1216. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 7 & 197. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 13. 1949; Moldenke, Phytologia 3: 467. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 10, 223, 361, & 471. 1959.

Herb; stems tetragonal, stramineous, lightly strigillose; nodes annulate, with a transverse band of short white hairs; leaves decussate-opposite, only the upper ones in and just below the inflorescence seen; petioles slender, 1--10 mm. long, sparsely scattered-pilose with short white hairs; leaf-blades thin-chartaceous, light-green, lanceolate, 1.5--4 cm. long, 7--20 mm. wide, acute or subacute at the apex, attenuate into the petiole at the base, rather regularly serrate from the widest part to the apex with blunt or acute broadly triangular forward-pointing teeth, scattered-strigillose on both surfaces with short appressed whitish hairs, more densely so along the venation beneath; inflorescence abundant; spikes slender, numerous, two from each upper node, three at the apex of each branch, 4--15 cm. long, rather densely flowered and fruited, often branched toward the base, the branches subtended by reduced leaves; peduncles slender, usually abbreviated to about 1 cm., lightly strigillose; bractlets lanceolate, about 2 mm. long, long-attenuate at the apex, ciliate-margined, otherwise glabrous, persistent after the fruit and fruiting-calyx have fallen; corolla very small, the tube about 2 mm. long, the limb slightly exserted; fruiting-calyx about 2 mm. long, strigillose, especially toward the apex, the teeth coming together over the apex of the fruit and forming a distinctly sharp point until the calyx is ruptured; fruit about 1 mm. long, smooth, long-coherent.

The type of this very puzzling species was collected by Moses Ashley Curtis -- in whose honor it is named -- somewhere in "Carolina" [probably North Carolina] and is labeled "Verbena caroliniana L." It is Herb. G. Geete no. 5702, now deposited in the herbarium of the Botaniska Trädgård at Göteborg, Sweden. The species reminds one of V. carolina L. in its general aspect, but differs markedly in its minute pubescence. It also resembles V. urticifolia L., but its fruiting-calyxes are more like those of V. scabra Vahl, from which its non-scabrous leaves at once distinguish it. It differs from V. riparia Raf. and V. urticifolia in its dense fruiting-spikes and from the former in its non-lobed leaves. Its full fruiting-calyxes seem to preclude xV. engelmannii Moldenke or any other hybrid origin. A common name recorded for it is

"hierba de la mula".

In all, 3 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: NORTH CAROLINA: County undetermined: M. A. Curtis s.n. [e Carolina] (Go--type, N--photo of type, Z--photo of type). CULTIVATED: Belgium: M. Martens s.n. [h. b. lov. 1845] (Br, N).

xVERBENA DEAMII Moldenke, Revist. Sudam. Bot. 4: 18. 1937.

Synonymy: Verbena bracteata x stricta Palmer, Ann. Mo. Bot. Gard. 22: 629. 1935 [not V. bracteata x stricta Schneck, 1941]. Verbena stricta x bracteosa Bebb ex Moldenke, Revist. Sudam. Bot. 4: 18, in syn. 1937 [not V. stricta x bracteosa Engberg, 1958, nor A. S. Hitchc., 1940]. Verbena stricta x bracteosa Eggert ex Moldenke, Revist. Sudam. Bot. 4: 18, in syn. 1937. Verbena stricta x bracteosa Mackenzie ex Moldenke, Revist. Sudam. Bot. 4: 18, in syn. 1937. Verbena stricta x bracteosa Rydb. ex Moldenke, Revist. Sudam. Bot. 4: 18, in syn. 1937. Verbena bracteata x stricta Gates, Fl. Kans. 190. 1940. Verbena stricta x bracteosa Sandberg ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena stricto-bracteosa Patterson ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947 [not V. stricto-bracteosa Engelm., 1940]. Verbena stricta x bracteosa Waite ex Moldenke, Résumé Suppl. 3: 41, in syn. 1962. Verbena stricta-bracteosa Michx. ex Moldenke, Résumé Suppl. 3: 41, in syn. 1962. Verbena bractiosa x stricta Holzinger ex Moldenke, Résumé Suppl. 3: 36, in syn. 1962.

Bibliography: E. J. Palmer, Ann. Mo. Bot. Gard. 22: 629. 1935; Moldenke, Revist. Sudam. Bot. 4: 18. 1937; Gates, Fl. Kans. 190, map 1072a. 1940; Moldenke, Prelim. Alph. List Invalid Names 45. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 6--9, 11, & 101. 1942; Moldenke, Alph. List Invalid Names 50. 1942; Moldenke, Castanea 10: 38. 1945; Moldenke, Alph. List Cit. 1: 40 & 181. 1946; Moldenke, Phytologia 2: 327. 1947; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 22 & 27. 1947; Moldenke, Alph. List Cit. 2: 518 & 522 (1948), 3: 699, 708, 773, 800, 887, 892, & 912 (1949), and 4: 1098, 1229, 1255, & 1261. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 12, 13, 15--17, 20, & 197. 1949; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 127, 131, & 134 (1952) and pr. 2, 3: 127, 131, & 134. 1958; Moldenke, Am. Midl. Nat. 59: 345. 1958; Moldenke, Résumé 16, 17, 19, 21, 22, 25, 359, 375, & 471. 1959; Moldenke, Résumé Suppl. 3: 5, 6, 36, & 41 (1962) and 4: 3. 1962.

Illustrations: Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 134 (1952) and pr. 2, 3: 134. 1958.

This name has been proposed for the natural hybrid between V. bracteata Lag. & Rodr. and V. stricta Vent., commonly found where the ranges of these two species overlap in the central United

States. The hybrid resembles V. bracteata in habit, but is stouter, with broad, laciniate, strongly reticulate leaves, larger flowers, smaller usually not foliaceous bractlets which are mostly about 5 mm. long and are long-attenuate or long-acuminate at the apex, the spikes usually only 6--10 mm. wide and poorly fruited, and the pubescence in the inflorescence only softly villous.

Collectors have found this plant in copses and on sandy plains, describe it as "decumbent", "procumbent", "ascending", or "erect", and have collected it in flower and fruit from June to August.

The type of the hybrid was collected by Per Axel Rydberg at Kearney, Buffalo County, Nebraska, on June 20, 1895, and is deposited in the Britton Herbarium at the New York Botanical Garden. The name, V. stricta x bracteosa Waite is based on Waite s.n. from Mount Carmel, Wabash County, Illinois, collected on August 6, 1887, and deposited in the herbarium of the University of Illinois; V. bracteata x stricta Gates is based on J. B. S. Norton s.n. from Manhattan, Riley County, Kansas, collected in August, 1892, and deposited in the herbarium of Kansas State College; V. stricta x bracteosa Sandberg is based on Sandberg s.n. from Hennepin County, Minnesota, collected in August, 1881, and deposited in the herbarium of the New York State Museum at Albany; V. stricta x bracteosa Eggert is based on Eggert s.n. from Saint Louis, Missouri, collected in August, 1886, and deposited in the herbarium of the New York State Museum at Albany; and V. stricto-bracteosa Patterson is based on H. N. Patterson s.n. from Henderson County, Illinois, collected in July, 1872, and deposited in the herbarium of the New York State Museum at Albany.

The hybrid is recorded from Jasper County, Missouri, by Palmer (1935) and from McPherson County, Kansas, by Gates (1940). Herbarium specimens have been misidentified and distributed in herbaria under the names V. bracteata Lag. & Rodr., V. stricta Vent., V. bracteosa x stricta Eggert, and V. bracteoso-stricta Engelm.; Sheldon calls it "V. bracteata x hastata", which it certainly is not.

The so-called V. bracteata x stricta of Schneck is xV. perriana Moldenke; the V. bracteosa x stricta of Britton, of Palmer, and of Schneck are also xV. perriana; the V. bracteosa x stricta of Deam, of Eggert, and of Rydberg are xV. rydbergii Moldenke; and the V. stricta x bracteosa of Hitchcock is xV. perriana, while that of Engberg is typical V. bracteata Lag. & Rodr. The V. stricto-bracteosa of Engelmann is xV. perriana.

Wallis describes the plant as "somewhat ascending. The H. R. Bennett s.n. [Brewster Arnold Ranch, August 2, 1957] in the United States National Herbarium bears a note "evidently a hybrid with V. stricta Vent. or some other species", but I regard this specimen as representing typical V. bracteata.